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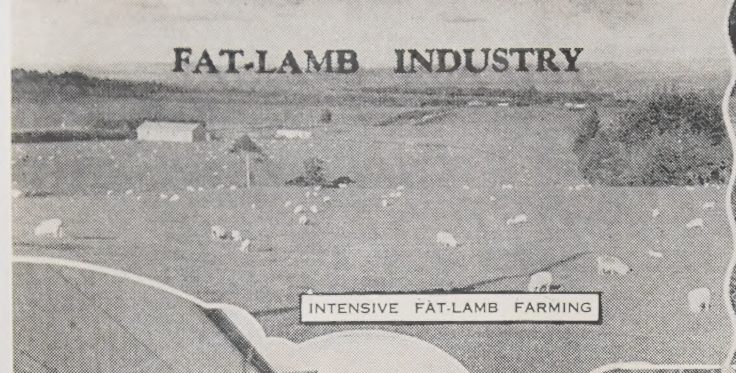
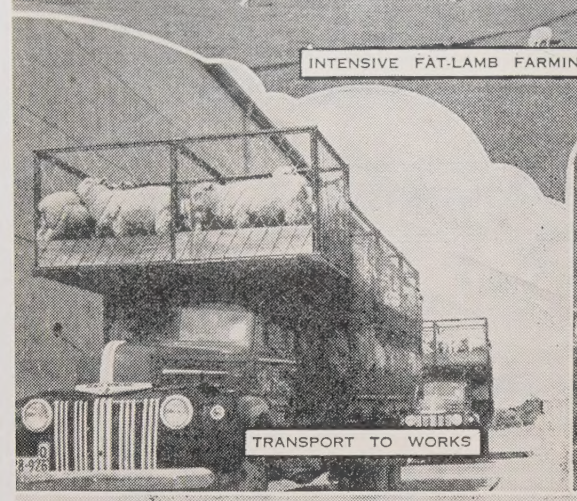
FAT-LAMB INDUSTRY

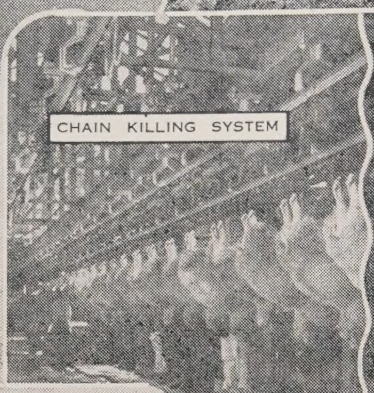


INTENSIVE FAT-LAMB FARMING

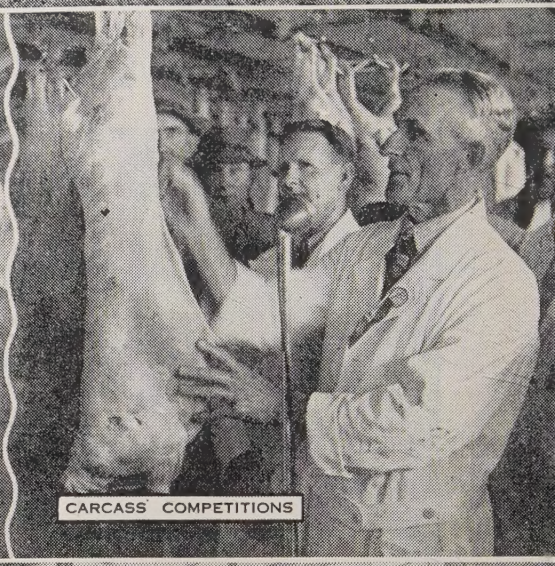
FATTENING ON RAPE



TRANSPORT TO WORKS



CHAIN KILLING SYSTEM

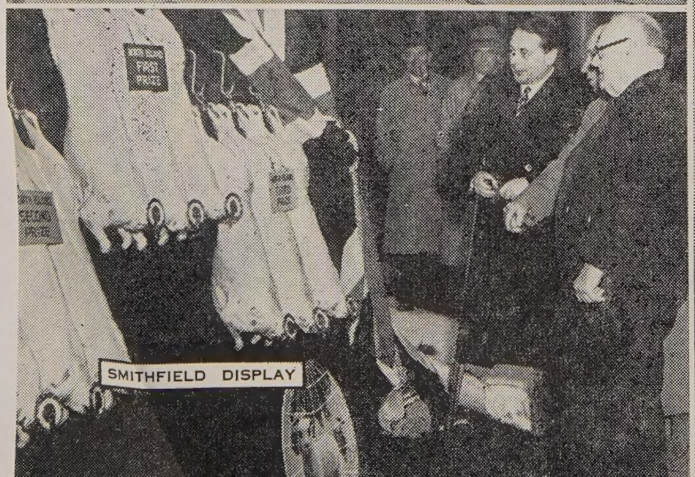


CARCASS COMPETITIONS

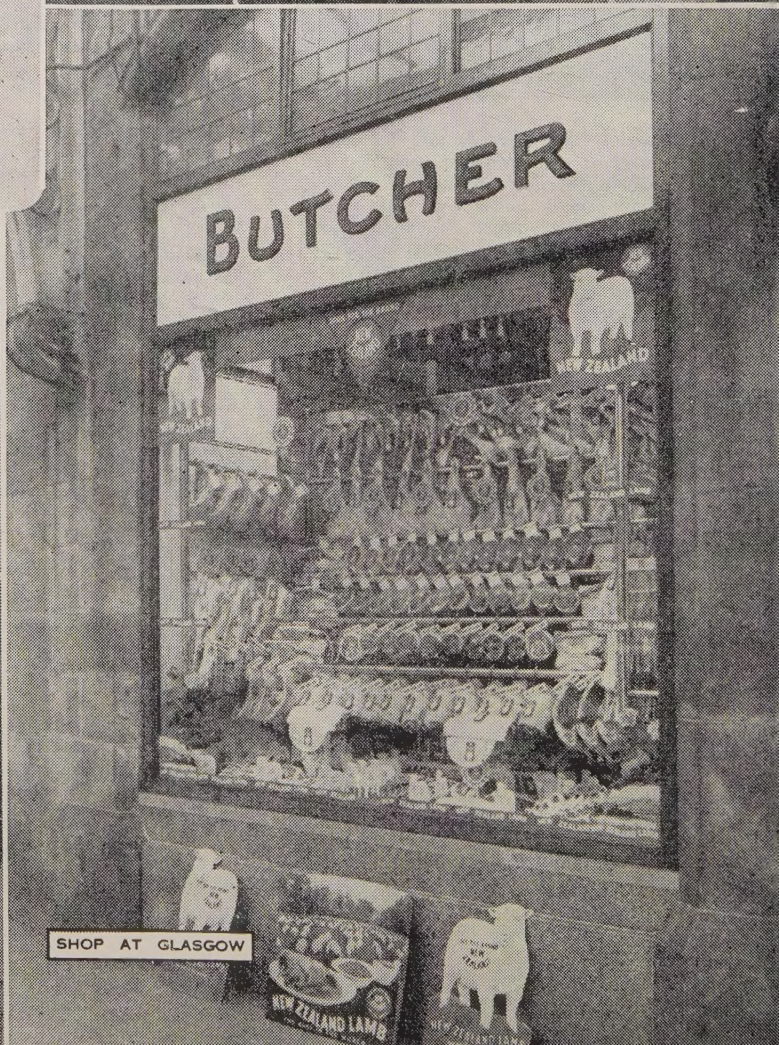
Fat-lamb production is a major item on the credit side of New Zealand's national economy, 10 to 11 million lambs being killed for export in a normal year. New Zealand lamb is a popular part of the Briton's meat diet. Fat-lamb farming, which can be undertaken under a wide range of soil and climatic conditions from Northland to Southland, can be divided roughly into two classes—farms which fatten most of the lambs on their mothers and those which rely on crops or pastures after the lambs are weaned.

Photographs: Top left and second from top at right by Sparrow Industrial Pictures Ltd.; top right by Green and Hahn Photography Ltd.; second from top at left and centre by National Publicity Studios.

CARCASSES AT WHARF



SMITHFIELD DISPLAY



SHOP AT GLASGOW

An Enlightened System of Farm Training

I HAVE drawn attention before in this page to the lack of a comprehensive system of training of recruits to the agricultural industry and the grave disadvantage primary producers face in competing with other industries for a regular inflow of young labour and brains. For many years now industries other than farming have been intensifying their efforts to win youth to their ranks, and attractive and efficient apprenticeship and vocational training systems have been perfected. With labour statistics showing ever-increasing numbers of unfilled vacancies in industry, competition for young people coming on to the employment market is certain to become even keener, and I feel that a further reminder to producers themselves and to their organisations that this is a matter worthy of their serious consideration is not untimely.

In the field of farm training for youths the State, through the Department of Agriculture's Farm of Instruction at Flock House, Bulls, is setting an example worthy of close study by the industry. It cannot, of course, be claimed that the Flock House service, augmented by a few other training institutions assisted by the Department and others sponsored by other organisations, is anywhere near adequately meeting the demand. Rather should these schemes, and Flock House in particular, be considered as models of what should be striven for in a service sufficiently comprehensive to safeguard the future of agriculture. That there is a demand for such training is evident from the long waiting lists of applicants at these farming institutions. There is a large potential source of recruits to agriculture in both town and country. If the attractive curriculum offering at Flock House were more widely available, the agricultural industry would draw off a just share of this potential labour supply that it at present loses because of lack of incentive.

When Flock House was taken over in 1937 by the Department of Agriculture it might have been expected that it would become trammelled by many of the disadvantages many consider inherent in a State enterprise. Study of the curriculum there today and of operations and developments at the station would impress the most prejudiced observer with the spirit of enterprise and incentive that is a spur to the trainees and the staff alike.

The Flock House tradition of farm training is an old and honoured one. Flock House boys have not only proved themselves in subsequent agricultural pursuits, but have reflected credit on the thoroughness and practical nature of their training.

The acquisition of Flock House by New Zealand sheep owners after the First World War and the establishment of the trust to administer the scheme of agricultural training for the sons of deceased and disabled British seamen were a magnificent gesture. Subsequent conduct of the scheme was in keeping with the spirit of the endowment.

Under the present administration a number of vacancies are reserved each year for boys from Britain, but the balance of the trainees are now drawn from New Zealand applicants.

Under qualified instructors a system of learning by doing is nicely balanced with theoretical instruction through lectures. Most important, however, in embuing trainees with an appreciation of the importance of their work is the way in which the everyday seasonal operations at the station have been integrated with development projects and experimental work associated with departmental research at other stations. The boys are thus pointed to wider horizons than were ever opened to the lad whose enthusiasm was dampened in so many cases on the land by being condemned to an unrelieved diet of the chores of a rouseabout.

Science today marches hand in hand with the farmer, and the Flock House trainee is given every opportunity to appreciate the advantages of the partnership. Stock he handles in the day-to-day work of the station may be destined for projects of departmental research stations at Wallaceville, Rukuhia, or Invermay. Work that is well advanced in the development of 1500 acres of sand country, the renewal of 2000 acres of run-out pastures, and the establishment of a 500-acre fat-lamb farm as a separate unit within the station allows observation of the benefits of the application of scientific knowledge to practical farming.

In such conditions where the mind is stimulated the trainee rapidly becomes an enthusiast. Such should be the ideal aim in any system of recruitment of young labour and brains to an industry that will have increasing need of these commodities. Recruits will rapidly become converts if the vista is a stimulating one of mental as well as physical endeavour.

The merit of the system practised at Flock House I feel is beyond question and I commend it in principle as being worthy of study as a blueprint for a more comprehensive effort by the industry generally. The quality of such recruitment is undoubted, but the quantity leaves room for grave misgivings.

K. J. HOLYOAKE, Minister of Agriculture.

New Method of Destroying Bees in Hives Infected with American Foul-brood

DESTRUCTION of bees in hives infected with American foul-brood has in the past been carried out by the use of calcium cyanide, but the use of the method on a large scale is attended with grave risk to the operators. This article by D. S. Robinson, formerly of the Department of Agriculture, Hastings, and R. G. Nairn and T. Palmer-Jones, both of the Department of Agriculture Animal Research Station, Wallaceville, describes a safe method of destruction in which benzene hexachloride (available commercially as "Gammexane") smoke generators are employed.

BEEKEEPERS are required to destroy the contents of hives found by Apiary Instructors to be infected with foul-brood and to sterilise thoroughly any remaining hive equipment.

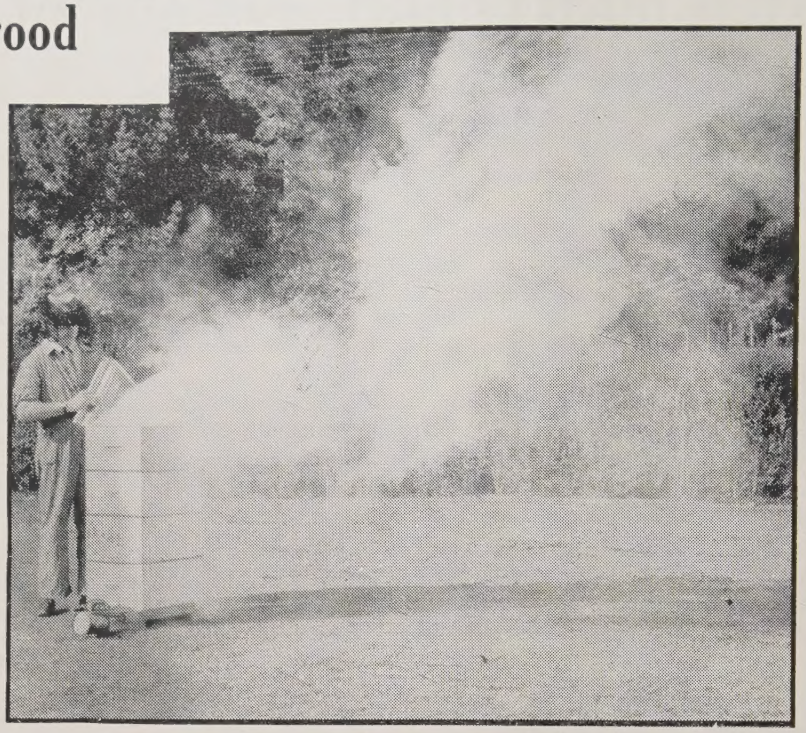
In the past a commercial preparation of calcium cyanide in a granular form has been found to be the most effective agent for the destruction of bees in diseased hives. It releases prussic acid gas when exposed to the moisture in air and this gas rapidly poisons the bees. In practice a tablespoon of the calcium cyanide powder is placed on a piece of cardboard which is slipped into the hive entrance at night or when the bees are not flying. The entrance is then closed and within a few minutes the gas evolved has killed the bees.

The sole drawback to the use of calcium cyanide for destroying bees is that the gas generated is highly poisonous to humans and great care must be taken not to breathe it. Although calcium cyanide is satisfactory for the destruction of individual hives, the use of it on a large scale is attended by some risk. The carrying of the substance in a motor-car can sometimes be dangerous if the tin becomes corroded or its lid is not properly closed. On hot, windless days when the bees in several hives in an apiary must be destroyed the use of calcium cyanide may be attended with risk, as the gas liberated will not always be dissipated quickly enough to prevent the operator being exposed to it.

Calcium cyanide could be handled with safety if a special respirator were worn, but this would be uncomfortable, particularly in hot weather, and the respirator canister to be effective would have to be renewed frequently.

Before calcium cyanide was adopted for killing bees they were destroyed by burning sulphur under hives, by sprinkling petrol on the bees, or by employing other unsatisfactory methods.

The authors of this article hoped to discover a method of destroying diseased bees which would be both safe and satisfactory.



Lid of hive removed to show dense smoke produced from a "Gammexane" generator.

Destruction of Bees by Lethal Sprays

It was thought possible that bees in hives could be satisfactorily destroyed by subjecting them to a toxic aerosol. An aerosol may be described as a system of very fine particles suspended in a gas such as air. Fog and smoke are aerosols. The aerosols used in the following experiments were projected from a hand projector of a type in commercial use. The material under test was poured into the pressure chamber of the projector and carbon dioxide gas from a soda-water siphon bulb was used to supply the pressure necessary to force the substance through a fine jet so that it emerged as an aerosol.

Nicotine: A strong 4-storey hive was used in the experiment. A solution of 33 per cent. (approximately) nicotine in dichloroethyl ether was projected under the hive mat between the combs of the top super on February 9. The entrance of the hive had been first blocked with a sack. The projector was used for 5 seconds. An hour after the projector had been used the hive was opened. Only a few bees were dead, showing that the nicotine spray was ineffective.

Up to February 12 no additional hive mortality was observed. This was confirmed by an examination on February 14.

D.D.T.-pyrethrum: A 4-storey hive was used in the experiment on February 9. This was treated as before for 10 seconds, using a D.D.T.-pyrethrum aerosol (public health formula). The hive received 18 gm. (28 gm. = 1oz.) of the mixture. One hour after spraying had been done the hive block was removed and it was noticed that many bees were dead. Five hours after treatment the hive was inspected and about half the bees were found to have died. The method is therefore unsatisfactory.

There was no additional hive mortality up to February 12. On February 14 the bees were observed to be normal and the queen laying well.

Saturated solution of benzene hexachloride in carbon tetrachloride: Approximately 60 millilitres (30 millilitres = 1 fl. oz.) was projected in the front and on the top of a 2-storey hive. Preliminary experiments on a strong hive had shown that carbon tetrachloride alone, poured on the hive mat, would cause unconsciousness of all the bees in 10 minutes, although they soon recovered from its effects. The bees were all overcome at once, but some commenced to regain consciousness after a few minutes, although they were obviously affected by the benzene hexachloride. All the bees in the hive died some hours after treatment.

Approximately 80 millilitres of the same mixture was projected as before into a strong 4-storey hive. The bees became unconscious almost at once, except for a few which could still crawl after the spraying and some which could fly. Twenty minutes later many bees regained consciousness and commenced to crawl. Three wire cages were filled with the least-affected

bees (10 per cage) from the top, middle, and bottom of the hive, and these bees were kept under observation in an incubator. All these caged bees died within 3 hours, except for 5 in one cage which lived a little longer.

The main drawback to this method of destroying a colony is that bees regain consciousness before the combs can be burnt. Although these bees will ultimately die through the effects of the benzene hexachloride, the drawback is a serious one.

Saturated solution of benzene hexachloride in chloroform: Tests showed this to be less effective than the last solution.

Nitrobenzene: Approximately 60 millilitres was projected in the front and on the top of a single-storey hive, which was then closed for 15 minutes. When the hive was opened at the end of this period the bees were unable to fly, but very few were dead. The fumes alone were not very toxic to the bees. The nitrobenzene had much the same effect as petrol.

Owing to its slow action, nitrobenzene is unsuitable for destruction of bees in hives.

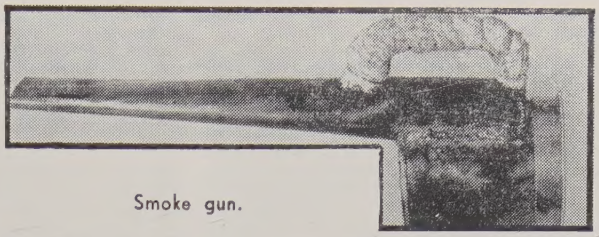
Other Methods of Destruction

The following substances were tested for toxicity without using a projector.

Chloropicrin: A strong 2-storey hive was used in the experiment. Thirty c.c. of commercial chloropicrin of the type used in soil fumigation and rabbit destruction was poured over the hive mat and the roof was quickly replaced, the front of the hive having been blocked with a wet sack. Within 12 minutes all the bees were dead or dying and within 25 minutes all were dead except for a few that barely lived and could not move. Although at this stage the roof and entrance block were removed to air the hive, the chloropicrin persisted on the equipment and affected the eyes of the operators very unpleasantly for more than 2 hours afterward.

The treated hive was aired by placing a wire screen partly covered by the lid over the top and wire gauze across the entrance. The following day no traces of the chloropicrin remained. However, in practice it would usually be very inconvenient to delay burning a hive for 24 hours.

It is apparent that though this substance kills the bees very effectively it would not be suitable for general use unless the operator wore a respirator.



Smoke gun.

Methyl bromide: A trial of methyl bromide, often used as a refrigerant, showed that it was unsuitable for the destruction of bees in hives.

It is apparent that none of the methods described would be suitable for beekeepers or Apiary Instructors in the field. For the destruction of odd hives chloropicrin, if it is already being used by the beekeeper for other purposes, would be of value. However, its use generally is not recommended.

"Gammexane" Smoke Generators

"Gammexane" smoke generators contain a smoke-generating mixture in which is incorporated the gamma isomer of benzene hexachloride, a substance highly poisonous to bees. When the generators are ignited they burn quickly and the benzene hexachloride is evolved as a fine smoke which leaves a residual film on all exposed surfaces. This film is highly lethal to bees and other insects for weeks after its deposition. Trials with the generators as a means of destroying bees in hives showed that they were highly effective.

Methods of Using "Gammexane" Smoke Generators

Three methods of using "Gammexane" smoke generators were tried: Lighting the generator inside the hive, lighting smoke-generating powder outside the hive, and lighting the generator outside the hive.

1. Lighting Generator inside Hive

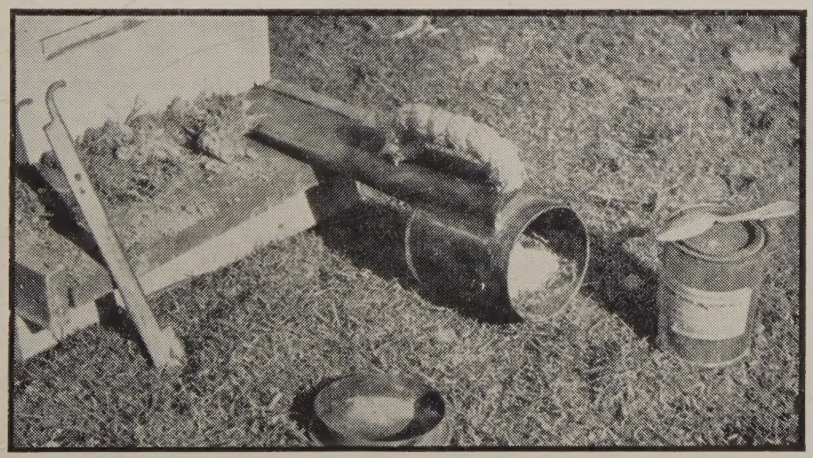
When the generator is lit inside the hive the hive entrance is blocked with earth, sacking, or sods, and the roof and hive mat are removed, being replaced by an empty half super. The generator is lit by being held in the hand at an angle of about 45 degrees so that the flame from a match can be applied to its edge. As soon as the generator ignites, shown by the production of smoke, it is placed on a piece of tin about 3in. square in the half super and the lid is quickly replaced, with a sugar sack, preferably damp, inside it to prevent loss of smoke. The tin is necessary because some heat is given out by the generator while burning. The smoke will be seen to force its way through cracks in the hive, but, unless these are very large, the smoke lost is not sufficient to affect the efficiency of the method. If there are large cracks or holes in a hive, they can be closed with adhesive tape or soil. The generator can be lit in a half super at the bottom of the hive, but although this results in a slight increase in efficiency, the procedure is not usually warranted, because of the extra manipulation required.

The smoke generators burn for only a few minutes. Soon after the generator has been lit in a hive the bees are unable to fly and all of them are usually dead within 30 minutes. Within 10 minutes of lighting the generator the bees are sufficiently unconscious to be burnt. The insides of the hive bodies, roof, bottom board, frames, and combs are covered with the smoke, which remains highly toxic to bees for a long period after the burning of the generator, and all bees alighting on such equipment die.

Although the smoke is irritating to the nose and throat, the generators are safe to use and do not expose the operator to the risks associated with the handling of calcium cyanide.

Residual effect of smoke from generators: An experiment was carried out to determine if equipment from a hive destroyed with a smoke generator could be re-used safely after being thoroughly flamed with a blowlamp. A 4-storey hive was treated with a generator on January 4 and the next day the supers, roof, and bottom board from the treated hive were flamed thoroughly inside with a blowlamp until the wood was slightly charred. They were then used to replace similar equipment in a strong, 4-storey hive, no hive mat being used. A queen excluder, above a half-depth super, was placed below the bottom super to hinder removal of any dead bees and assist observations on mortality.

No evidence of hive mortality was noticed until January 8 when about 50 feeble and dead bees were seen on the bottom board, but none in front of the hive. From then until the final



Funnel of smoke gun inserted into hive, showing smoke-generating powder on sacking, which is lit with a match.

inspection on February 2 the bees, brood, and queen were normal.

It is thus apparent that thorough flaming with slight charring of equipment after destruction of a hive with a "Gammexane" generator volatilises the residual benzene hexachloride and makes the equipment safe to use. The fact that flaming to the point at which slight charring of woodwork occurs is necessary to make the equipment safe for use is an advantage, as it forces beekeepers to carry out thoroughly this part of the treatment for eradicating American foul-brood.

The honey in a hive treated with a "Gammexane" generator is unfit for human consumption.

Next an experiment was conducted to determine the toxicity of the smoke left as a residue on unflamed equipment. On January 22 a generator was burnt in a half super over 3 supers full of combs but with no bees. The supers were provided with roof and bottom board. After 30 minutes the combs were removed and the equipment exposed to the weather for 7 days. During this period heavy rain fell and there were periods of sunshine. On January 29 the material was used to house a strong 3-storey hive the combs from which were lifted into the treated supers. A queen excluder was placed over the treated half super which was placed below the brood chamber. No hive mat was used. The transfer took place at noon. Two hours later about 200 dead bees were found to have been removed from the hive and many more were above the queen excluder.

Three and a half hours after the transfer the combs and bees were transferred to fresh equipment. At this time about half the bees were dead and dying. Symptoms of poisoning were excitability and paralysis.

On January 30 many bees still appeared excited, some were having fits, and deaths were still occurring. About two-thirds of the bees in the hive had died. The remaining bees did not show symptoms on February 1, and a thorough examination the next day showed that survivors had returned to normal. By February 6 survivors of the colony were normal and the queen was laying.

This experiment shows the high residual toxicity to bees of benzene hexachloride smoke on equipment.

2. Lighting Smoke-generating Powder outside Hive

A smoke gun for lighting smoke-generating powder outside the hive was designed by R. G. Nairn. It has proved very effective. It consists of a charge holder in which the powder is placed and ignited and a tapered funnel which fits comfortably between the hive and bottom board. The advantage of this method is that the bees need not be disturbed in any way.

The gun is simple and can be made by any plumber. If it is likely to be in constant use, it should be constructed of brass or copper and the parts brazed together. However, in the case of a beekeeper who requires to destroy only a few colonies occasionally a less durable model can be made from ordinary flat iron. The lid should be of the press-on type with a lining of soft asbestos so that it makes an airtight seal when pressed home.

The charge holder is approximately 5in. long by 4in. diameter with a removable lid. The funnel is fixed on top of an opening cut in the holder so that the two communicate. The long arm of the funnel should be parallel to the long axis of the holder. The funnel should project beyond the charge holder about 12in. and the end be tapered off to be approximately 2½in. x ½in. Inside the charge holder is placed a metal tray on which the powder is ignited. A carrying handle on top is a convenience. (See the upper illustration on page 245.)

In using the gun the funnel is first inserted into the front entrance of the hive and the space on each side blocked with earth or sods. It is advisable to insert the end of the funnel to one side of the hive entrance, as otherwise there may be a tendency, particularly if the bees have formed a cluster, for bees to drop down over the end of the funnel and impede the entry of smoke.

It has been found that the powder can be ignited easily by using small pieces of sacking soaked in a solution of commercial saltpetre and dried. These pieces of sacking are placed on the grating in the chamber of the charge holder and covered with the powder. A match is applied to a corner of the sacking. As this treated sacking is inflammable, it should be carried in a tin to avoid risk of accidental ignition. The powder can also be ignited directly, though not so readily, if it is placed on a piece of dry sacking and a cottonwool swab soaked in methylated spirit and fixed at the end of a piece of wire is used. As soon as the powder ignites the lid is quickly pressed home on the charge holder.

After the charge has finished burning in the holder the funnel may be withdrawn from the hive and the opening so exposed closed with earth. This leaves the gun free for use on another hive.

3. Lighting Generator outside Hive

A "Gammexane" smoke generator may be lit in the usual way and when alight placed in the charge holder, which is quickly closed. However, if a wind is blowing and no shelter is available the generator will be found more difficult to ignite than the powder.

The advantage of the gun is that no empty half-depth supers are required and hive manipulation is unnecessary.

The gun method has proved safe and satisfactory for destroying bees lodged in the weatherboarding of houses and similar inaccessible places where the use of calcium cyanide could be dangerous to the occupants.

In such cases a gun may be dispensed with if the generator is ignited in a shallow tin. When this method is used care should be taken that no inflammable material comes in contact with the lighted generator. Although the smoke will travel some distance, the tin should be placed as near the bees as possible. If the generator cannot be lit close to the bees, two generators may be burnt simultaneously.

The sole drawback to the use of "Gammexane" smoke generators in place of calcium cyanide for the destruction of bees is that the method is more costly. The possibility of using cheaper toxic agents in the smoke gun is being investigated.

Source of Supply of Generators and Types to Use

"Gammexane" smoke generators are available through stock and station agents. For burning inside the hive 1 "Gammexane" smoke generator No. 22, which is supplied in tubes of 3 or 6, is required. For use in the gun outside the hive 6 teaspoons of "Gammexane" smoke generator No. 15, which is supplied as a powder in 10oz. tins, are needed.

METEOROLOGICAL RECORDS FOR AUGUST

Station	Height of station above M.S.L. (ft.)	Air temperatures in degrees (Fahrenheit)				Rainfall in inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	201	49.4	— 1.6	63.6	31.0	8.33	25		1.77	26	131.8
Auckland	160	51.4	— 0.8	64.2	39.6	8.32	21	+ 3.69	2.92	22	145.9
Tauranga	10	48.3	— 1.4	64.4	30.1	5.26	13	+ 0.52	2.04	22	163.2
Ruakura	131	46.4	— 1.4	62.0	26.0	4.01	19	0.00	0.62	12	145.5
Rotorua	969	45.6	— 0.9	62.5	31.0	2.18	12	— 2.99	0.59	8	138.8
Gisborne	12	48.0	— 1.7	61.9	31.8	6.17	22	+ 2.46	1.21	16	123.7
New Plymouth ..	160	48.5	— 1.1	60.5	32.6	4.86	18	+ 0.75	0.99	22	155.2
Napier	5	48.4	— 0.7	63.1	32.1	4.11	17	+ 1.12	1.12	17	127.6
Karioi	2125	40.8	— 1.2	60.0	27.0	3.72	12	— 0.24	0.94	10	
Wanganui	72	47.0	— 2.1	61.8	30.8	2.04	16	— 0.73	0.37	11	137.6
Palmerston North .	110	46.4	— 1.3	60.4	29.0	2.45	19	— 0.90	0.66	11	116.7
Waingawa	350	44.9	— 1.0	60.5	25.0	3.66	22	— 0.60	0.63	17	106.1
Wellington	415	46.6	— 1.0	61.2	33.1	3.59	19	— 0.83	1.09	20	137.1
Nelson	24	45.8	— 1.2	59.9	29.2	1.42	8	— 1.91	0.68	10	185.2
Blenheim	12	45.5	— 1.3	63.2	26.9	2.35	12	+ 0.06	0.65	23	170.4
Hokitika	12	44.0	— 0.7	62.7	27.6	7.78	15	— 1.52	1.53	28	164.2
Hanmer Springs ..	1225	38.4	— 3.0	60.8	16.6	5.77	13	+ 2.29	2.12	24	121.9
Christchurch ..	22	43.2	— 1.1	62.2	24.8	1.35	16	— 0.70	0.32	14	138.6
Ashburton	323	42.6	— 1.1	65.2	26.0	0.98	11	— 1.25	0.30	17	125.7
Timaru	56	42.6	— 1.2	60.0	26.5	1.06	7	— 0.33	0.63	23	124.5
Alexandra	520	39.2	— 2.2	59.2	25.4	0.90	10	+ 0.25	0.36	16	144.3
Taieri	80	41.7	— 2.0	58.1	23.3	1.71	13	— 0.24	0.44	16	124.7
Invercargill ..	32	41.9	— 2.0	61.0	25.0	3.18	17	+ 0.15	0.60	15	157.2

Pasture Responses to Molybdenum Topdressing in Otago and Southland

OF considerable practical importance is the discovery of soils in Otago and Southland on which pastures respond to a marked degree to topdressings of what, to the farmer, seem extraordinarily small amounts of molybdenum. Although the experiments to be described in this article by E. B. Davies, Senior Chemist, Department of Agriculture Rukuhia Soil Research Station, Hamilton, G. A. Holmes, Superintendent, Department of Agriculture Invermay Agricultural Research Station, Mosgiel, and P. B. Lynch, Field Crop Experimentalist, Department of Agriculture, Wellington, have been in progress for a short time only, marked pasture production increases have been secured from molybdenum topdressings during that period. Interim results from these trials are presented because of the considerable practical significance of the results to farmers and research workers.

Country under development at the Department of Agriculture Invermay Research Station, showing hill soils flanking the Taieri Plain typical of those where molybdenum responses have been obtained.

IN Otago and Southland heavy liming is considered to be of great benefit to pasture and crop production. In the early days liming changed beyond belief the productivity of the soils concerned, but over the years, more particularly on flat land, the lime status has been built up. Heavy dressings, however, are still frequently applied. Moreover, responses to liming are recorded in cases where, by soil analysis, the measure of lime requirement would suggest no lime was needed. A possible explanation of such responses would be the existence of a deficiency of some trace element, the element either being supplied as an impurity in the lime or made more readily available as a result of lime dressings.

Spectrographic analysis of two representative Southland limestones suggested that it was unlikely that trace elements were present in appreciable amounts as impurities. Of the ordinarily recognised trace elements only molybdenum increases in availability as the soil becomes neutralised with the addition of lime. Attention was therefore directed to the possibility of a molybdenum deficiency.

On an ironstone soil in Northland observational and yield trials that have been conducted since 1945 indicated responses of pasture to molybdenum additional to the much greater responses obtained when lime, superphosphate, and potash were applied. The total molybdenum in this soil was more than twice as high as that in any other soil examined to date. The matter of availability was evidently involved, and, working on Australian soils of known molybdenum response supplied by Dr. C. S. Piper, of the Waite Institute, research officers directed their attention toward a chemical method of determining "available" molybdenum. A method that placed the Australian soils in the order of response, and also gave a low figure for the ironstone soil, was eventually found* and has since been applied to a variety of New Zealand soils, including those of Otago and Southland. Some Southland soils and a number from the Invermay Research Station proved particularly low in available, though not in total, molybdenum.

Observational topdressing trials as well as yield trials with sodium molybdate were commenced in 1946. A liming trial at the Invermay Research Station was modified to include molybdenum treatments. The results from the yield trials at Invermay and South Hillend (Southland) and a number of observational trials are summarised in the following sections.

Trial at Invermay

Invermay Research Station includes about 400 acres of second-class undulating country, which has a shallow soil overlying stiff, yellow clay derived from phonolite rock. This soil requires liberal applications of lime and phosphate and even then will not hold grass well unless the stock management can follow counsels of perfection. The disappearance of the better grasses is a consequence of the failure of clovers to thrive. Analysis showed that the soil was very low in available molybdenum, containing only .04 part per million. The total molybdenum content was 0.91 part per million.

The paddocks chosen for the trial had been sown to pasture under oats in the spring of 1948, receiving 1 ton per acre of carbonate of lime at that time. The pasture was topdressed with 3cwt. per acre of superphosphate in April, 1950, but showed little response, this being ascribed to the exceptionally dry weather experienced from February to December, 1950. The sward was thin and showed signs of running out, but still contained a good proportion of Montgomery red clover. This fact may have an important bearing on the results achieved. The ryegrass and cocksfoot appeared unthrifty.

An area of this paddock was rabbit netted and a block of 32 plots was laid out to give 4 replications of 8 different treatments on a randomised plan. All the plots received a basal dressing at the rate of 1cwt. per acre of serpentine superphosphate (in addition to the 3cwt. of superphosphate applied in April, 1950) and 1cwt. per acre of muriate of potash. The molybdenum contents of the lime and serpentine superphosphate used were determined as 0.17 and 0.73 part per million respectively. The amounts applied in these materials would therefore be very light.

The treatments were as follows:—

1. No lime.
2. No lime, 2½oz. of sodium molybdate per acre.
3. ¾ ton of lime per acre.
4. ¾ ton of lime and 2½oz. of sodium molybdate per acre.

* The method will be described in a paper to be submitted to the New Zealand Journal of Science and Technology by J. L. Grigg. Tamm's oxalate extractant was used (1).

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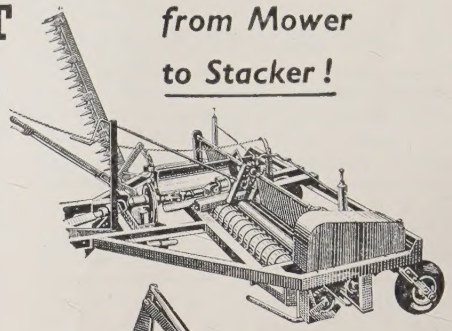

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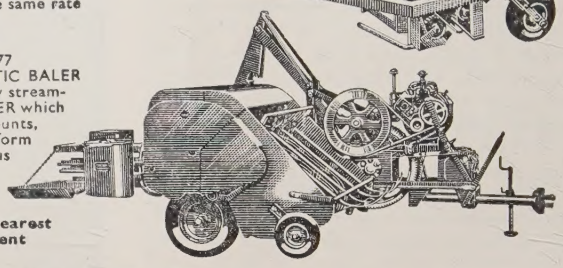

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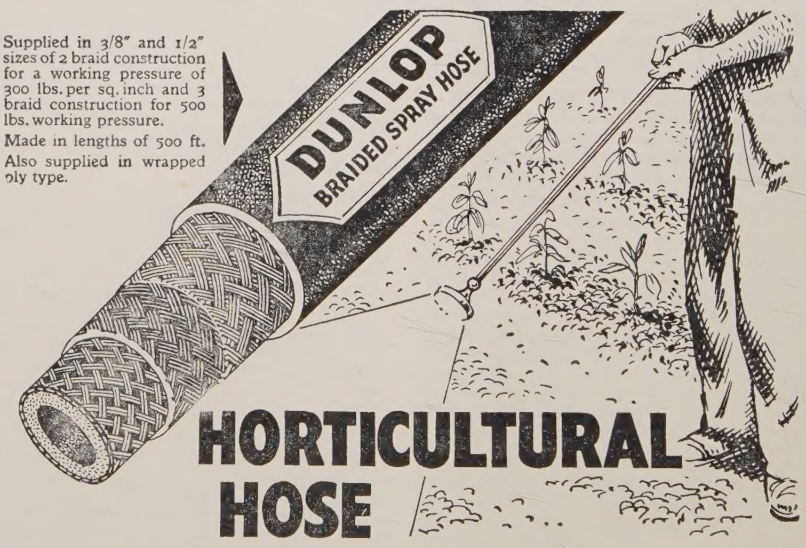

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YIELDS OF GREEN MATERIAL IN LB. PER ACRE
(Period December 8, 1950, to March 28, 1951)

	No lime	¾ ton lime	1½ tons lime	3 tons lime	Means
No molybdenum	10,200	10,800	9,700	15,000	11,400
2½oz. sodium molybdate per acre ..	15,500	15,300	16,100	15,400	15,500
Means	12,850	13,050	12,900	15,200	

5. 1½ tons of lime per acre.
6. 1½ tons of lime and 2½oz. of sodium molybdate per acre.
7. 3 tons of lime per acre.
8. 3 tons of lime and 2½oz. of sodium molybdate per acre.

The trial was laid down on December 8, 1950, and within 1 month remarkable improvement had been made in the plots treated with molybdenum. Each plot could be picked out from the gateway by its dark green to the sharp line of the plot boundary and by its luxuriant growth of clover. Results of the first three mowings on this trial are given in the table above.

For each of the three mowings the over-all response to molybdenum has been, statistically, highly significant. The difference between "lime 3 tons per acre" and "no lime, no molybdenum" has been always significant. The "lime x molybdenum" interaction is significant in the table, as there was a response to lime at 3 tons per acre on the plots that did not receive molybdenum, but no response was received in the presence of molybdenum. In brief, 2½oz. of sodium molybdate per acre has given practically the same result as 3 tons of lime per acre.

Over the first two cuts the increase on the molybdenum plots, measured in terms of dry matter of pasture herbage, was 28 per cent. above the mean of the "no molybdenum" plots.

A great deal of further work with molybdenum has been planned at Invermay, and it is yet too early to generalise from the results so far obtained. The special conditions of this trial were:—

It was on pasture which had been reasonably well treated with lime, phosphate, and potash.

It was on a paddock containing a good proportion of clovers, particularly Montgomery red clover, which may be specially responsive.

Pasture production records were secured in the absence of stock grazing, using the "mowing and clippings returned" technique (2).

Future trials are planned from which stock-grazing and production data will be obtained in addition to pasture-production records.

Trial at South Hillend

The South Hillend trial is on the property of Mr. J. Hazlett, whose farm is situated about 30 miles north-west of Invercargill. The soil is a silt loam and the pasture practically pure browntop with a trace of white clover. It had received no manure or lime for several years at least before the trial was laid down.

The following treatments were applied on August 13, 1950:—

1. Control.
2. 1 ton of Dunback lime per acre.
3. 2½oz. of sodium molybdate per acre.
4. 1 ton of lime and 2½oz. of sodium molybdate per acre.

The trial was on what is termed a "latin square" layout, with 4 replications of treatments. All treatments received a basal dressing of 3cwt. of superphosphate plus 1cwt. of muriate of potash per acre.

In the early stages no definite responses to treatments could be seen, and at a weighing on January 30, 1951, there were no significant differences among the treatments. Observations on March 31 indicated, however, a marked response to molybdenum in white clover content and growth, and these were confirmed by the mowing weights on April 3.

YIELDS OF GREEN HERBAGE IN LB. PER ACRE
(Cut April 3, 1951)

	No lime	1 ton lime	Means
No molybdenum ..	137	183	160
2½oz. sodium molybdate per acre .	226	183	205
Means	181	183	

The response to molybdenum is statistically significant on the "no lime" plots and in the means over both "lime" and "no lime" plots. As in the Invermay trial the interaction "lime x molybdenum" is significant because there is a response to molybdenum in the absence of lime only. It will be seen that this result is of the same nature as that obtained at Invermay.

Observational Trials

Of 17 observational trials now in progress, molybdenum responses have been recorded in 5, while a further 5 trials, laid down in 1951, have not been open sufficiently long to give any indication of future responses. However, the evidence available suggests that molybdenum responses are unlikely on most soils which have received considerable lime dressings in the past and on pastures which are at a high level of production. Further, it is certain that responses to molybdenum are unlikely to be found on all soil types. Apart from the ironstone soils of Northland, the only definite responses so far recorded are on the clay hills adjacent to the Taieri Plain (represented by the Invermay and Outram trials) and at South Hillend in Southland.

Arising from the marked molybdenum responses at Invermay and on the observational trial at Outram, a molybdenum survey of the hill soils flanking the Taieri Plain has been commenced and will later be extended to other areas. The "available" molybdenum in the 40-odd soils so far taken in the survey and from the Invermay hill blocks has ranged from 0.02 to 0.23 part per million. Only four figures have exceeded the 0.10 part per million tentatively regarded as the response level.

This demonstration of molybdenum deficiency is of interest because of the remarkable responses earlier reported in South Australia (3, 4), West Australia (5), and Tasmania (6).

The finding has economic significance, for the incorporation of a few ounces of sodium molybdate in a fertiliser would be considerably cheaper, particularly on hill country, than liming at the rates required to make the natural soil molybdenum available to plants.

It seems that very minute amounts of molybdenum are required. The 3 tons of lime in the Invermay trial presumably had its effect through increasing molybdenum availability. However, no increment in the molybdenum content of the pasture could be detected. Molybdenum was applied at 2½oz. per acre, higher rates being considered as potentially dangerous to stock grazing the pasture. Molybdenum is essential for the nitrogen-fixing activity of the nodule organisms on clover roots, and the clover response is due largely to these bacteria fixing nitrogen more efficiently.

Future Work

Farmers endeavouring to assess the value of molybdenum under different conditions may meet with some disappointments. It is, therefore, of urgent importance to intensify the research programme of work dealing with molybdenum.

Some of the problems to be investigated after the initial work include:—

1. Trials with different rates of application of sodium molybdate to investigate the optimum dressing in conjunction with varying applications of lime and phosphate. It is not suggested that molybdenum can take the place of calcium or phosphate as a plant food.
2. Trials of sodium molybdate on pastures of different ages to study the possibility of preventing "running out" of sown pastures and the rejuvenation of deteriorated pastures which it may not be practicable to plough up.
3. The interaction of sodium molybdate with lime and various forms of phosphate, especially on soils where response to liming and topdressing is not very marked.
4. The use of sodium molybdate to encourage establishment of clovers when sowing down on cultivated land or when surface sowing on hill land.
5. Trials with sodium molybdate on annual crops and on Montgomery red clover and other clovers saved for seed.
6. The duration of the effect of an application of molybdenum.
7. The effect of molybdenum on the growth rate and health of livestock.

Observational trials with molybdenum are being laid down on all areas where an unexpected lime response has occurred and also where analysis has shown a low figure for available molybdenum. Low figures obtained in the hill-country soils bordering the Taieri Plain have already been mentioned and trials are being extended in this region. Attention will be paid to areas particularly responsive to basic slag. In the Outram trial marked responses to 2cwt. and 4cwt. per acre of basic slag were obtained, but there were no responses to even 1 ton per acre of superphosphate. A sample of basic slag

examined contained 7.5 parts per million of molybdenum compared with 0.5 part per million in superphosphate. If the basic slag response was due to contained molybdenum, it is remarkable that as little as 1/40oz. per acre applied in the 2cwt. of slag should have proved effective. (The ton of superphosphate contained almost as much molybdenum as 2cwt. of basic slag.)

The Department of Agriculture is rapidly expanding research activities into molybdenum investigations from all possible angles, and as further information comes to hand it will be made available to farmers. Meantime farmers are recommended to seek the advice of their local Instructor in Agriculture before applying molybdenum.

Excessive applications of molybdenum can do lasting harm to the soil and result in pastures toxic to stock. The recommended rate of 2½oz. per acre of sodium molybdate should not be exceeded.

References

1. "Meddelande fron Statens Skogssorsoksanstalt", vol. 19, pp. 387-404, O. Tamm (1922). (Details are given in the Monthly Letter No. 1 of the Imperial Bureau of Soil Science.)

2. "New Zealand Journal of Science and Technology", vol. 28, No. 6A, pp. 385-405, P. B. Lynch (1947).

3. "Journal of the Australian Institute of Agricultural Science", vol. 8, pp. 73-75, A. J. Anderson (1942).

4. Bulletin 198, part 1, Council for Scientific and Industrial Research, Australia (now Commonwealth Scientific and Industrial Research Organisation), A. J. Anderson and M. P. Thomas (1946).

5. "Journal of Agriculture of Western Australia", vol. 27 (third series), pp. 118-120, T. C. Dunne (1950).

6. "Tasmanian Journal of Agriculture", vol. 14, pp. 69-73; vol. 15, pp. 65-70; vol. 16, pp. 1-4, 109-111, E. F. Fricke (1943, 1944, and 1945).

Radio Broadcasts

A RADIO broadcast to farmers will be given from Station 1YZ Rotorua at 7.15 p.m. as follows:—

November 8—Talk by secretary, Eastern Bay of Plenty District Young Farmers' Clubs' Committee.

A radio broadcast will be given from Station 3YA Christchurch at 7.15 p.m. as follows:—

November 15—"New Thoughts on a Vital Necessity—Culling the Poultry Flock", by C. Goldsmith, Poultry Instructor, Department of Agriculture, Christchurch.

The following broadcasts will be given from Station 4YZ Invercargill at 7.15 p.m.:—

November 12—"Classing the Clip", by W. F. Dick, Wool Instructor, Department of Agriculture, Invercargill.

November 26—"Hay and Silage Making", by R. W. Bush, Assistant Instructor in Agriculture, Department of Agriculture, Invercargill.

Other talks are given from 1YA Auckland on Tuesdays at 12.35 p.m., 1YD Auckland on Thursdays at 7.30 p.m., 1XN Whangarei on Mondays and Wednesdays at 8.10 p.m., 1XH Hamilton on Mondays at 8.45 p.m., 2YZ Napier on Tuesdays at 7.10 p.m., 2YA Wellington on Thursdays at 12.35 p.m., 2XN Nelson on Thursdays at 8 p.m., 3YA Christchurch on Mondays at 12.20 p.m., 4YA Dunedin on Thursdays at 12.35 p.m., and 4YZ Invercargill on Mondays at 12.35 p.m.

Pig Broadcast

A broadcast will be given by the Bay of Plenty District Pig Council from Station 1YZ Rotorua at 12.35 p.m. as follows:—

November 22—"Curd Preservation for Winter Feed Supply", by A. F. Barwell, Supervisor, Bay of Plenty District Pig Council.

Value of Trees near Apiaries: Making of Hive Roofs

Seasonal Notes for the Domestic Beekeeper

THE provision of trees and shrubs to supply both shelter and food for bees and the making of hive roofs are discussed in this month's article for the domestic beekeeper by S. Line, Apiary Instructor, Department of Agriculture, Invercargill.

BEFORE the spring becomes too advanced and other work more pressing it is desirable to encourage bees out of doors in search of pollen and nectar and for "cleansing flights". For their general health, especially after long periods of cold and changeable weather, they require the stimulation that early-spring floral sources can provide. In exposed districts where weather is persistently changeable or rainfall is high bees are often "sitting at home" when a little extra encouragement would induce them to visit early-flowering shrubs or trees at every opportunity when the weather improved even temporarily.

Stimulus from Flowering Shrubs

If hives are close to native bush, they will receive a natural stimulus from such flowering shrubs as fuchsia, kowhai, kamahi, and manuka and in certain areas from the flowering of heath or heather. Opportunity should be taken to put in cuttings of plants that are known in each locality to be of interest to bees. In many cases also a shrubbery or hedge of such plants as flowering currant or pussy willow close to an apiary acts as shelter to that area and produces a "pocket" of warm air that will indirectly help to maintain a steady hive temperature.

In winter these apiary hedges may sometimes obviate having to visit apiaries after a storm or gale to replace roofs, recover bees that are wet and cold, and sometimes lift up hives blown over. Bees disturbed at such a time are likely to be vicious. If species of trees which flower at different periods of spring are planted near apiaries, not only will shelter be provided, but the bees will be assured of a continuous food supply. Sycamores, laurels, tree lucerne, and various types of willow and fruit trees all contribute to the building up of the hive and the encouragement of the queen to proceed with the spring work of laying eggs and developing an expanding brood nest.

Emergency Feeding

In areas where bees have no good source of early nectar supply it will be necessary to check that some hives do not become short of food. A simple method of feeding bees in an emergency where the hive population is strong is to raise the back of the hive slightly by hand and shovel about two cups of dry sugar on to the bottom board. Alternatively the hive lid may be lifted and the dry sugar placed on the hive mat, provided there is sufficient space to prevent the sugar coming into contact with the lid and the bees below have easy access to it. These methods are not satisfactory where the bees are weak or low in population.

[*Commercial Studios photo.*
Waterproofing a sack roof by painting it with bituminous paint.

The building of new hive material, either for increasing the number of hives or for replacing worn parts, should be done now rather than later in the season. The various parts for making hives can be bought from manufacturers or their agents, but the making of hive parts is work that some beekeepers may like to do themselves. One of the problems to be overcome by anyone intending to make hive roofs is the procuring of sheet-metal, and as the price of this material has increased, alternatives must be considered.

The use of tarred roofing material is satisfactory if the owner is prepared to give it a dressing of bituminous paint every 2 years; otherwise the material will shrink and tear away from the clouts that hold it and become separated from the wooden frame.

Use of Sacking

More cohesion can be given to the whole of the roof by the fixing of light hessian or sacking material over the wood. It is pulled tight and the cut edge is turned up and under and fixed with clouts. When roofs are made to take this material the sharp edges round the top of the wood should be given a ¼in. chamfer. This will eliminate any tendency for the wood to cut or wear through along the edges of the sacking.

After the membrane of light sacking has been fixed over the woodwork it is painted with bituminous paint, which will make the material close-fitting and durable. The lighter the sacking the less paint will need to be applied, but the material used should be tough and not partly perished. The quantity of bituminous paint necessary will be reduced if the top of the wood is previously painted with waste paint. This reduces absorption into the wood of the final coating over the sacking.

Hydatid Disease Can be Eradicated

MORE than 100 new cases of hydatid disease in human beings are recorded in New Zealand hospitals every year, and about 14 of every 100 end fatally. There can be little doubt that many cases of infection exist other than those diagnosed. The nature of the disease and measures necessary to control it are discussed in this article by A. D. M. G. Laing, Assistant Director, Livestock Division, Department of Agriculture, Wellington.

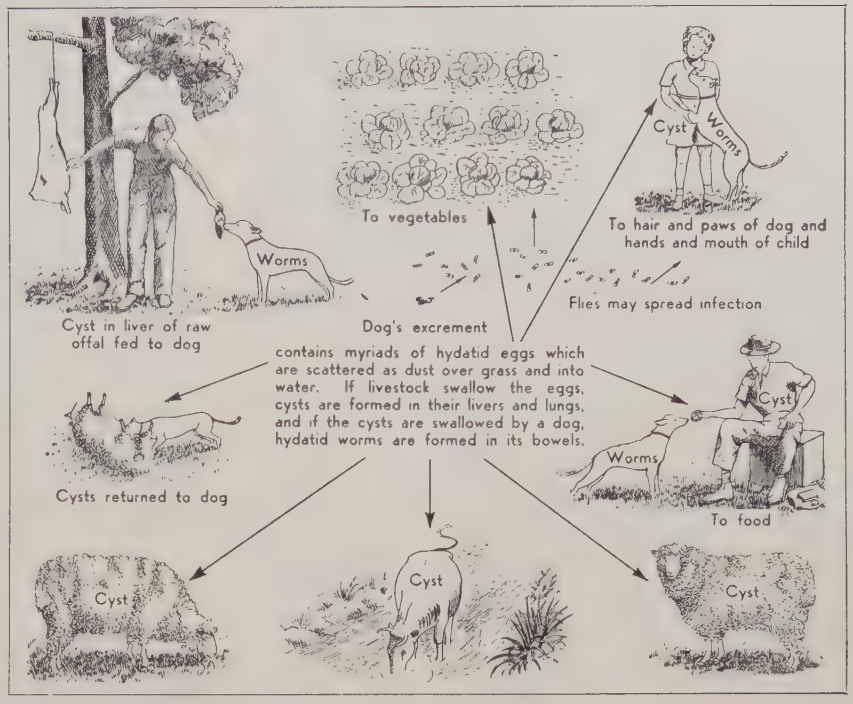
HYDATID disease in man is caused by the bladder or cyst stage of a segmented tapeworm, *Echinococcus granulosis*, which exists in the bowel of the dog. It can also live in the bowel of the cat, but then remains sterile and therefore harmless to man or stock. The worm is about ¼in. long and up to 20,000 can exist in the bowel of one dog. As with all tapeworms, both sexes are combined in each worm. The head, which attaches itself to the wall of the dog's bowel, has up to four segments growing from it. The last segment, containing hundreds of fertilised eggs about 1/500in. in diameter, drops off and is deposited on the ground with the dog's droppings. This occurs at frequent intervals as fresh segments mature and drop off. On reaching the ground the segments break up and the minute eggs are blown about. Very large numbers of these eggs are voided daily by even a mildly infected dog, and as they settle on grass, in dust, and on the coats of dogs and the wool of sheep everyone on the farm can readily be contaminated.

If these eggs are swallowed by a human being or a farm animal up to 3 months after being voided by the dog, they hatch out in the bowel of the host and the living embryos bore through the bowel wall into the blood-stream. They are carried in the blood and, if they lodge in the liver, lungs, or other organs, develop into large bladders or cysts. In farm stock, which are usually killed in their prime, these cysts rarely cause adverse symptoms, but a substantial economic loss is caused by livers condemned from this cause after slaughter. In the human being these cysts grow larger and by pressure on surrounding tissues may cause very serious symptoms and possibly death, or they may rupture spontaneously with similar results. A major surgical operation is the only possible treatment, for no drug can affect hydatid cysts in stock or man.

Preventing Infection

If dogs in New Zealand were prevented from feeding on hydatid cyst material in offals or in dead sheep or other farm animals, the hydatid scourge would cease. If a dog eats the cysts or material from them, the sandy material in the cysts will develop in the bowel of the dog into the tapeworms described, which will be mature and producing eggs about 6 weeks after being swallowed.

The weakest point in the life history of the hydatid tapeworm is the period it spends in a cyst in the body of a farm animal. If left there, it must perish, and if the offals are destroyed, it must perish. Natural decay will render hydatid cyst material in a carcass harmless in up to 3 weeks.


Worms
Cyst in liver of raw offal fed to dog
To vegetables
Cyst
Worms
To hair and paws of dog and hands and mouth of child
Flies may spread infection
Dog's excrement
contains myriads of hydatid eggs which are scattered as dust over grass and into water. If livestock swallow the eggs, cysts are formed in their livers and lungs, and if the cysts are swallowed by a dog, hydatid worms are formed in its bowels.
Cysts returned to dog
Cyst
Worms
To food
Cyst
Cyst
Cyst

The next weakest point is when the tapeworm is in the bowel of the dog. Arecoline hydrobromide, the drug issued with dog licences, is 98 per cent. effective against it at this stage if used correctly.

Dosing of Dogs with Arecoline

Arecoline hydrobromide acts on the nervous system of the dog, causing the movements of the muscular lining of the bowel to be greatly increased and the membrane lining of the bowel to pour large quantities of liquid into the bowel cavity. The tapeworms are, in fact, washed out of the bowel by the action of the drug. They are not killed by the drug, and that is why destruction of purged material is important, as it is very infective to farm stock and human beings.

Failure to dispose of sheep carcasses as soon as mortalities are discovered is a major handicap to achievement of control of hydatid disease. Dogs worry dead sheep and the cycle of disease is started again.

Particularly as arecoline hydrobromide acts through the nerves which control the bowel, the dog should be in good health when dosed. For example, a dog may have an accumulation of bony material in the bowel, particularly if it is old and unsuitably fed, and a dog in such a condition will be caused considerable pain and distress by the dose. Owners who value their dogs should ensure that they are in sound order before they are drenched and do not show pain or strain when defecating.

Arecoline normally acts in 20 minutes to an hour, but may take as long as 2 hours. Fairly solid material from the lower bowel is usually passed first, followed by liquid material from the upper parts of the bowel, containing mucus, fluid poured out from the bowel lining by the action of the drug, and tapeworms which may have been present. All purged material must be scraped up with a spade and burnt.

The dose of arecoline hydrobromide is based on the weight of the dog, and the quantities recommended are:—

Toy dogs and puppies ½ tablet (⅛ grain).
Small breeds such as fox terriers and Scotch terriers 1 tablet (¼ grain).
Border collies, spaniels, and similar dogs 2 tablets (½ grain).
Large collies, setters, retrievers, and similar dogs 3 tablets (¾ grain).

If the drug does not operate in 2 hours, half the previous dose may be given immediately or a slightly bigger dose may be given several days later. The drug does not kill the worms, but paralyses them temporarily, in which condition the bowel action of purgation sweeps them out with the faecal matter. If purgation does not occur, therefore, repeating the dose is of the utmost importance.

A dog to be dosed must not have food for 24 hours beforehand and should not drink for 5 hours before the dose is administered. It is recommended that the tablets be dissolved in 1 to 2oz. of water and the dose given in a 2oz. bottle. The dog should be held between the knees, facing away from the person drenching it, and the muzzle grasped with the left hand, with the jaws held tightly closed with finger and thumb and the nose pointed upward. Holding the bottle containing the dose in the right hand, the drencher inserts the first and second fingers into the corner of the dog's mouth and pulls the skin outward, making a pouch into which the liquid can easily be poured. The dog must swallow the dose if its head is held with the nose pointing upward.

When the dose has been swallowed the dog should be tied up and petted, or led about on a leash and talked to, to distract its attention. If a number of dogs are being dosed one after another, they may be tied up so that they cannot lower their heads. These precautions help to prevent the dose being vomited up. If the dose is retained for as short a time as 6 minutes after administration, it may be effective, so if the dog does vomit, the dose should not be repeated until at least 2 hours have elapsed without purgation.

Because dogs are intelligent and sometimes can associate cause and effect, they may become cunning and difficult to dose after repeated administrations. To overcome this the water used for mixing the dose may be flavoured with meat essence or sweetened with sugar. Another method is to crush the pills and insert them in a small pellet of meat, fat, or butter, which will be accepted eagerly after 24 hours' starvation.

The recommended method of dosing a dog with arecoline hydrobromide as described on the left.

Proprietary preparations for use against dog tapeworm, usually combining arecoline hydrobromide with a small quantity of arsenic, are available through club and private veterinary surgeons.

Unless dogs are prevented from eating dead sheep or raw offals, arecoline dosing alone will not help, because dogs are constantly being re-infected.

Disease Can be Beaten

Hydatid disease is an occupational risk of people who live and work on sheep farms in New Zealand, but the disease can be beaten if these lines of attack are followed:—

Feed dogs on livers, lungs, and other organs only if they are cooked, and destroy all organs not so used. Do not allow them access to dead carcasses. Keep a reserve of dog biscuits or meat meal for use if dog meat runs out. Boiled paunches and household scraps are also good feed for dogs. Veterinary surgeons will advise about canine nutrition.

Dose dogs every 3 months with the worm remedy issued with the licences. Ensure that their digestions, bowels, and general health are normal before they are dosed, as a dog suffering from constipation, for instance, may be greatly distressed by the dose. Some dogs are more sensitive than others to arecoline, just as some people require a heavier dose of a purgative medicine than do others, so note each dog's reactions in a diary as a reminder to adjust the dose on future occasions if necessary.

Above all, insist that only dogs that have been dosed or that are known to have been fed hygienically be allowed on the farm. If that is not done, all precautions will be nullified.

Though the measures necessary to eliminate the hydatid menace from New Zealand sheep farms are relatively simple and easy, a few individuals who do not co-operate, especially if they move about the country with their dogs, can delay elimination indefinitely. However, if general opinion is strong enough, recalcitrant dog owners may feel ashamed to find themselves detracting from the public welfare. For example, let every farmer ask anyone bringing dogs on to his farm: "Are they free from hydatids, because my dogs are, and my farm is".

☆

Trotter-skinning Machine

A MACHINE for removing the wool from sheep and lamb trotters which has enabled considerable quantities of wool to be saved and has resulted in more efficient recovery of neat's-foot oil from the trotters is now being used in several freezing works. The machine, which has been patented by the head fitter of a Poverty Bay freezing company, is driven by a 1½ h.p. electric motor and can be operated by a youth. It can handle trotters from a kill of 2500 per day, as there are always some forelegs which are not worth treating for the recovery of wool. When wool prices were at their peak the value of wool recovered was estimated at £40 per 1000 sheep—in total, a considerable sum per season.

The skinning machine overcomes clogging of the grinder which may occur when neat's-foot oil is being prepared from woolly trotters that have had insufficient cooking to remove the wool. Tests have shown that trotters processed by the machine yield more oil, because trotters do not have to be cooked to the extent of eliminating the wool. The shorter cooking period also results in considerable saving in fuel. Analysis has shown the neat's-foot oil produced from skinned trotters to be 75 per cent. less acid than oil produced from unskinned trotters.

The illustration shows an unskinned trotter and a trotter which has been through the machine.

Subscription Rates to the "Journal"

The subscription rate to "The New Zealand Journal of Agriculture" within New Zealand is now 10s. a year and the overseas subscription rate is 13s. (sterling) a year. New Zealand school subscriptions are 5s. a year and the subscription rate for New Zealand forces serving overseas is 10s. (sterling) a year. All subscriptions include free postage. Subscriptions in force before August 1, 1951, are not affected by the increased rate.

Single copies of the "Journal" can be bought from the Department of Agriculture or from booksellers and newsagents for 1s. each.

Subscriptions for members of Young Farmers' Clubs and Country Girls' Clubs will be increased to 5s. a year in 1952, those for school clubs from the January issue and those for other clubs from the April issue.

The Home Vegetable Garden in November

By H. P. THOMAS, Vegetable Instructor, Department of Agriculture, Wanganui

THERE is much essential work to be done in the well-planned garden during November. Although general sowings and plantings may be made during the next few months, it is necessary to restrict these to anticipated family requirements, and with this aim in view it is usually found that small successional sowings instead of large ones are to be preferred. To have an excess of several vegetable varieties ready for harvesting at the same time is not only poor economy but shows unsound garden practice.

IN addition to the present general sowings for summer vegetable supplies, a start must be made to provide winter supplies by sowing seed of the following: Savoy cabbage, broccoli (early and late varieties), brussels sprouts, borecole, celery, celeriac, leeks, red cabbage, and sprouting broccoli.

Frost-tender plants such as cucumber, pumpkin, marrow, squash, and tomato can be planted now, but caution should be exercised in southern districts where frosts are likely until the middle of November. Cloches or improvised coverings may be used for protection in these districts.

Thinning of previous sowings should be carried out before the plants become too large, and where soil conditions are favourable liquid manure may be applied to most green crops to stimulate growth. If carrots are thinned when the soil is dry, the soil should be put back over them to avoid exposing the tops to attack by the carrot rust fly.

Transplanting

Transplanting of young cabbage, cauliflower, and lettuce plants should be continued. Earlier plantings of cabbage, cauliflower, and lettuce which may be showing signs of hearting will benefit from an application of animal liquid manure or from liquid manure made of 1 to 2oz. of nitrate of soda or sulphate of ammonia to 4 gallons of water.

Further sowings of main-crop potatoes can be made and earlier plantings can be earthed up.

If it is intended to plant early celery, the beds should be thoroughly prepared now.

Asparagus should not be cut for too long each season, as this may weaken the crowns; about 6 to 8 weeks is usually long enough even in established beds. Fern growth should then be allowed to develop.

Early-planted tomatoes should be tied up and the shoots which develop in the branch axils should be removed at least once a week.

Pea seedlings should be protected from birds with guards of wire netting or by using black cotton; sowings of peas should be continued.

REMINDERS FOR NOVEMBER

Sow: Brussels sprouts, broccoli (winter cauliflower), broccoli (sprouting), beetroot, beans (broad, dwarf, and runner), borecole (curly kale), cress, carrots, cucumber, choko, cauliflower (autumn and winter varieties), cabbage (autumn and winter varieties), cabbage (red or pickling), celery, celeriac, egg plant, kohl rabi, leek, lettuce, melon, marrow, mustard, onion (spring), parsley, pumpkin, parsnip, peas, radish, salsify, spinach (summer), spinach (New Zealand), silver beet, spinach beet, squash, sweet corn, savoy (winter) cabbage, turnip, tomato.

Plant: Artichoke (Globe) suckers, artichoke (Jerusalem), cabbage (summer and autumn varieties), cauliflower (summer and autumn varieties), cucumber, celery (early planting), celeriac (early planting), kumara, lettuce, melon, marrow, onions (autumn-sown crop), potatoes (main-crop), pumpkin, silver beet, spinach beet, squash, tomato.

[*Sparrow Industrial Pictures Ltd. photo.*

Beans (Dwarf and Climbing)

As all beans except broad beans are frost tender, they should be planted to coincide with the general improvement in the weather. Sturdy growth cannot be expected until the soil temperature is fairly high. Very early sowings often result in attacks by fungous diseases and consequent rotting. It is advisable to make successive sowings of dwarf beans if a continuity of supply is desired. However, most varieties of climbers will, if picked regularly, continue to bear throughout the season until they are cut down by frosts.

Beans can be grown successfully on a wide range of soils, but a well-drained, easily worked loam with a moderate calcium and humus content is to be preferred. Overcrowding of the plants should be avoided and this should be kept in mind when sowing the seeds.

The soil should be moulded up to beans to form a slight ridge when hoeing is being done. Supports preferably should be supplied before planting or shortly after plants come through the ground.

Information on planting distances, methods of supporting, and recommended varieties was given in last month's "Journal".

Beetroot

Beetroot can be grown in almost any kind of soil with a reasonable humus content, preferably supplied for a previous crop. If beetroot follows leaf crops in accordance with the usual rotation, the crop will require only a base dressing of blood and bone mixed with twice its weight of superphosphate applied at the rate of ¼lb. per square yard or about 4oz. to 6ft. of row. As is the case with all root crops heavy applications of organic or nitrogenous manures will cause forked or misshapen roots.

Cultivation should be deep and thorough and the soil should be well drained and not lacking in lime.

There are three main sorts of beetroot—globe, long red, and turnip-rooted—each of which has its particular value. The turnip-rooted and globe kinds are probably preferred for table use, but the long varieties give a high yield and often "stand" better in dry conditions. Early and late sowings are usually made with the globe or turnip-rooted kinds.

Seed should be sown ½in. deep in rows 12 to 15in. apart and the plants finally thinned 3 to 5in. apart, depending on the variety. Soil should be moist when thinning is done,

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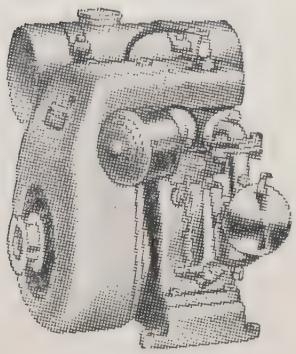

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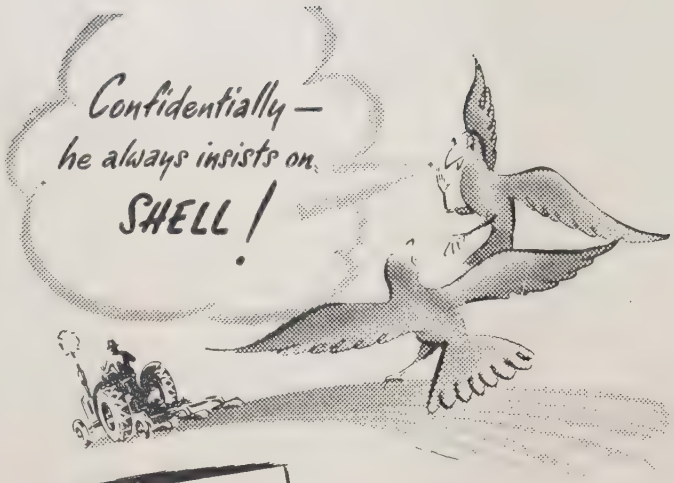

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and afterward it will be beneficial if the rows are watered to consolidate the soil round the remaining plants. Recommended varieties are:—

Globe: Derwent Globe, Crimson Globe, and Detroit Dark Red.

Turnip-rooted: Egyptian Turnip Rooted, Obelisk, Crosby's Egyptian.

Long red: Maori King.

Celery

In central and northern districts celery plants raised from a September sowing may be set out during November in beds or trenches.

It will be found that celery is more difficult to grow in warm weather than in cool conditions. A well-drained light loam rich in organic matter plus regular attention to spraying and watering are essentials for this crop.

In the home garden double or treble rows with 10 to 12in. between plants are usual if celery is planted in level beds.

Double rows or perhaps single rows are usual when the open-trench method of planting is used. A trench may be made 1ft. deep and 15in. wide for a single row or 24in. wide for a double row, plants being 10 to 12in. apart. A 4 to 6in. layer of farmyard manure or well-decayed organic matter should be dug into the trench or bed and then covered with 3in. of soil before planting.

When the trench method is used the soil is gradually filled in around the plants, care being taken that the centres are not filled with soil. Trenching and earthing up with soil are not done to the same extent now as they were, although it is often claimed by some that the quality of the celery blanched by being earthed-up is superior. As rots often develop in soil-blanched celery in hot weather, the trench method is perhaps more satisfactory in colder districts or for autumn plantings.

Beds on the flat are best blanched by placing 12in. x 1in. boards on edge along the outsides of beds.

The principal fungous disease of celery is leaf spot (*Septoria apii*); to prevent it Bordeaux spray or a proprietary copper substitute should be applied every 10 to 14 days.

[*Sparrow Industrial Pictures Ltd. photo.*

Tall varieties of peas may be preferred where the area of garden is comparatively small, because of their high yield per foot and because they have a much longer harvesting period than dwarf peas. Shelter from winds should be provided and the peas should be well supported.

Where aphis is also troublesome nicotine sulphate should be combined with either of the above fungicides at 1 fl. oz. to 4 gallons of spray.

Carrots

Sowings of carrots, one of the most important vegetables in the home garden, should not be overlooked. A successional sowing of an early variety is still advisable if carrot aphis or carrot rust fly is likely to be troublesome. Infestation of the main crop may be minimised by sowing seed in December or even January.

Carrots do well in a soil that has been heavily manured for a previous crop such as cabbage. If fertilisers are considered necessary, the crop will benefit from a dressing of superphosphate and dry wood ashes at 4oz. per square yard. This material should be broadcast over the soil and raked in before sowing the seed.

The inclusion of some radish seed in the carrot seed assists in breaking the surface crust which may form on some soils, and if hoeing is to be done before the carrot seedlings appear, the rows are clearly indicated by the radishes, which come through much earlier than carrots. The radishes may be harvested early, or if not required, they may be destroyed by cutting them below the collar with a sharp knife.

Carrot seed should be sown as thinly as possible in rows 12 to 15in. apart and ¼in. deep. Except in heavy soils which consolidate and prevent expansion, carrots rarely need thinning if sown correctly. They may be thinned where it is considered necessary to 4 to 6in. apart. The thinnings can be used for soups and stews. Recommended varieties are:—

Early: Early Short Horn, Early Krop, Early Market.

Main crop: Manchester Table, Chantenay, and James Intermediate.

Kumaras

The kumara or sweet potato requires a long season of growth. Therefore in districts where late frosts are experienced it can rarely be grown satisfactorily.

[*Green and Hahn Photography Ltd. photo.*

Celery sown in a trench. The soil is filled in gradually around the plants as they grow.

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Some tubers are usually started into growth in a warm frame and when the rooted shoots are a few inches long they are severed and planted out in seed boxes placed in a frame or in a sheltered situation for further development. The young plants which were started into growth in early September should be ready for setting out early in November. Alternatively, rooted shoots or "slips" can usually be purchased from seedsmen in districts where kumaras are grown. The kumara bed should be in a warm, sheltered situation, and a light, sandy, well-drained loam which has had organic manure added the previous year is best. The fertiliser application should be similar to that for potatoes. Three parts by weight of superphosphate mixed with 1 part of sulphate of ammonia and 1 part of sulphate of potash may be applied at the rate of up to 8oz. for 5yds. of row. The fertiliser should, however, be well worked into the soil before transplanting is done.

Planting may be done on the flat, but where there is no danger of the soil drying out the plants are usually set out on broad, low ridges, which warm quickly and facilitate digging of the crop. For proper development plants should be spaced at least 18in. apart in rows 24 to 30in. apart, and if conditions are dry, plants should be watered in. Deep planting is not recommended and it is usual to bend the rooted portion of each plant up in the form of a shallow U to encourage better tuber development. Apart from weed control and the repair of broken ridges, cultivation is unnecessary, though the rapid-growing runners should be lifted occasionally to prevent them from rooting at the nodes, as such rooting appears to favour leaf rather than tuber development.

Onions

In most districts in the South Island it is customary to sow main-crop onions in September or October, but in the North Island transplantings from an autumn sowing are usually made earlier (July-August). If a sowing has not been made, it should be done without delay.

Onions should be sown ½in. deep in rows 12in. apart in well-drained, finely cultivated soil that has been adequately firmed. If the soil is heavy and tends to restrict development, or if large onions are required, the plants can be thinned 3 to 4in. apart.

Onions are gross feeders and respond well to good cultivation and liberal though balanced manuring.

Weed growth should be kept down in established beds by shallow hoeing between the plants.

Varieties: Pukekohe Long Keeper and Turbot are recommended if bulbs for long storage are required; Ailsa Craig and Giant Rocca are suitable for more immediate use.

[*Sparrow Industrial Pictures Ltd. photo.*

Marrows are not difficult to grow and for the home gardener bush varieties are more suitable than trailing varieties. If given good treatment, bush marrows yield well.

Potatoes

Main-crop varieties of potatoes can still be planted as advised in last month's notes. Well-drained soil rich in humus is preferred and virgin soil or soil heavily manured for a previous crop is suitable. Lime is rarely necessary, as potatoes prefer an acid soil and the application of lime induces an alkaline condition, which favours the disease known as scab. This disease is also common in soils which are deficient in organic material.

Cultivation of established crops consists of the removal of weeds and the moulding up of soil from between the rows against the haulms and developing tubers. This ridging affords protection against the potato tuber moth and also ensures some protection if the foliage should become badly infected with late blight (*Phytophthora infestans*), as the blight spores are not so likely to be washed on to the tubers and the danger of tuber infection is thus reduced. Late blight, also known as Irish blight, does not appear every season in some districts, but in most parts of the North Island and in some parts of the South Island it is wise to spray with Bordeaux mixture (4oz. of bluestone and 5¼oz. of hydrated lime in 4 gallons of water) or with copper oxychloride (3oz. to 4 gallons of water), since neglect of this precaution may result in loss of the crop. Spraying should commence when the plants are about 5 to 8in. high and be repeated at fortnightly intervals.

Where the potato tuber moth may be troublesome an arsenate of lead spray (3lb. of powder in 40 gallons of water) should be applied. Alternatively the arsenate of lead can be combined with the Bordeaux. When plants have made considerable development 4lb. of arsenate of lead to 40 gallons of water or Bordeaux may be used.

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It is wise in most districts to spray potatoes regularly from an early stage as a precaution against late blight, which can cause the loss of the crop.

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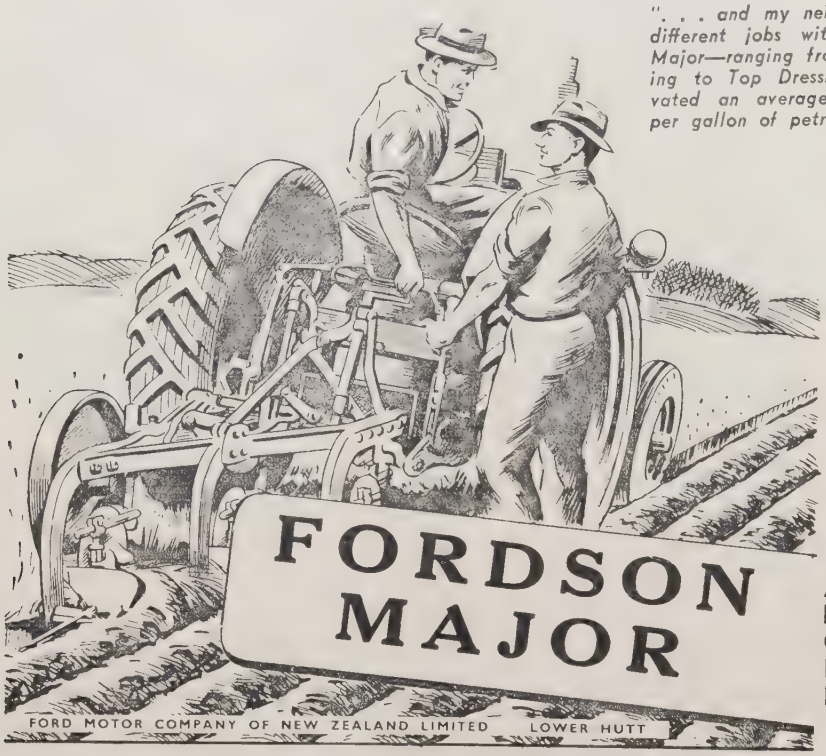

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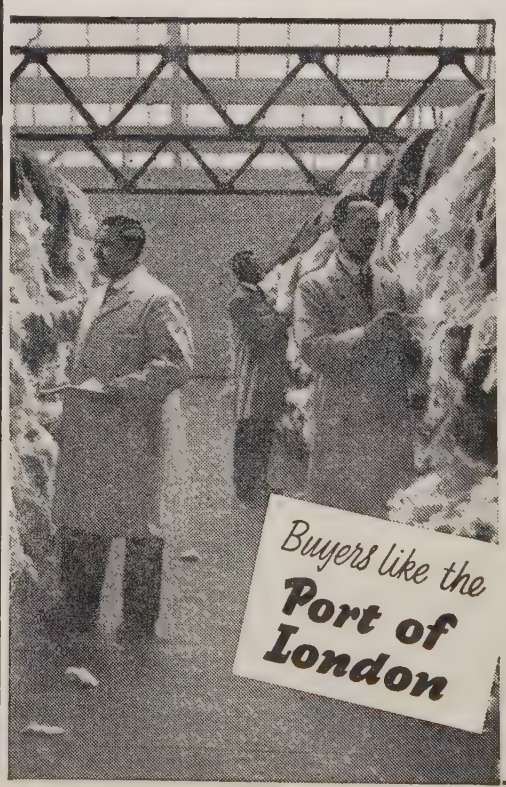

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Cucurbits

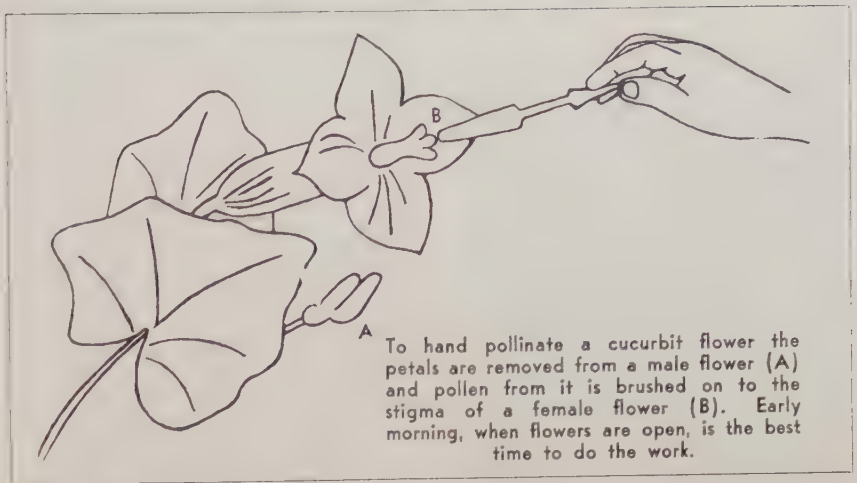
Cucurbits (pumpkin, squash, marrow, cucumber, and melon) are gross feeders and require a considerable amount of room.

They should be planted where their runners will not interfere with other crops, but they should get plenty of sunshine or they will be prone to mildew and will not give of their best. Too often they are relegated to any corner and practically left to fend for themselves.

Pumpkin, squash, and melon require a long season without frost and therefore marrow is usually grown in southern districts. A good practice in districts where the growing season is comparatively short is to start the plants on a hot-bed in pots or boxes under glass. Pots or paper containers are best, as the plants receive little check when being planted out from these containers.

Heavy soils usually give the best yields and produce better-quality fruits, although well-drained light, sandy soils are best for early crops. Good results are obtained if a circular hole is made approximately 2ft. in diameter and up to 1ft. in depth. This hole should be partly filled with farmyard manure, compost, or similar organic material and the soil then replaced to leave a round, flat-topped mound; this is known as the "hill" system of planting or sowing. If organic material is not available, a mixture of equal parts of blood and bone and superphosphate can be substituted by mixing it with the filling soil at the rate of 4 to 6lb. to each hill. For the bush varieties the hills may be made 4ft. apart with 4 plants to each hill. With the trailing varieties 6 to 8ft. spacings between hills should be allowed.

If seeds are being planted, they should be set 1in. deep at regular intervals around the edge of the bed by pushing them into the soil point end down. More seeds than the number of plants required should be sown, and if all the seeds grow, plants should be thinned to 4 per hill. A convenient method of watering to save wetting the topsoil or foliage is to sink a large tin with a number of small holes in the side in the centre of the hill before planting is done. Liquid manure or water can be regularly applied to the plants through this tin.



To hand pollinate a cucurbit flower the petals are removed from a male flower (A) and pollen from it is brushed on to the stigma of a female flower (B). Early morning, when flowers are open, is the best time to do the work.

As all cucurbits are shallow rooted, light cultivation to aerate the soil and check weed growth around the plants and hills is all that is necessary in the early stages. Later their heavy foliage has the effect of suppressing weeds. If conditions become dry, watering must be done regularly.

When the vines are 3 to 4ft. long the tops of the main leaders should be pinched back to promote the setting of fruit and to give more compact plants.

Male and female flowers are produced separately and lateral growths produce mainly female flowers; therefore where garden space is limited hand pollinating of the female flowers is advisable (see the diagram above). If plants are allowed to grow and pollinate naturally, the outcome is often straggly plants with fewer, although perhaps larger, fruits formed, mainly near the extremities of the vines.

Peas

Successive sowings of peas should be continued, as their season of harvesting is relatively short. Peas grow best in reasonably cool conditions and prefer a moist, well-drained loam with a high humus content; they respond to liberal dressings of lime. Blood and bone, 4oz. per 9ft. of row, may be applied with advantage and is best well worked in along the line of planting.

As the plants grow some form of support should be given; otherwise the vines provide a suitable hiding place for slugs, and the first-formed pods may become diseased or rot through coming in contact with the moist soil.

During dry periods the pea crop should receive a thorough overhead watering and this will also assist pollination. The soil should be kept frequently stirred and weed free.

Varieties: Popular main-crop varieties are Greenfeast, Stratagem, Southern Cross (Onward), Alderman, Coronation, and Quartermaster.

Sweet Corn

If a planting has not already been made, sweet corn should be sown this month. Because it requires consistently high temperatures throughout its long growing season, it is usually grown only in districts north of Mid-Canterbury. This crop is adaptable to a wide range of soil types, but best results are obtained on warm, well-manured medium or light loams.

Sweet corn requires soil enriched by heavy dressings of compost or farmyard manure or by a green-manure crop dug in sufficiently early to allow it to rot down.

On land that has been well supplied with such organic matter the addition of superphosphate at the rate of ½lb. to 12ft. of row should give good results. If sufficient organic manure is not available, an application of ½lb. of blood and bone together with a heavy dressing of wood ashes can be applied to each 12ft. of row and worked in before planting.

Sweet corn may be grown in rows to provide shelter for other tender crops or planted in clumps or hills. The latter method is recommended, especially when only a few plants are needed, because, as male and female flowers are borne separately, pollination is usually assisted. To allow for failures 7 or 8 seeds should be planted 1 to 1½in. deep in each clump; clumps should be 2½ to 3ft. apart. When the plants are about 2in. high they should be thinned so that four of the most vigorous are left. If planted in a row, plants should be 12 to 15in. apart. As the plants are shallow rooted, cultivation of them should be shallow, although a slight moulding up for support and the maintenance of upright growth is desirable in the early stages.

Popular varieties are: Golden Bantam, Marcros, Sixty-day Golden (early); Country Gentleman and Stowells Evergreen (mid-season).

Tomatoes

Unless some protection from frosts or inclement weather can be provided with early plantings, it is not advisable to set out tomatoes in most southern districts until the middle of November. Soil preparation should begin early and any organic matter should preferably be dug in some time before planting. A deeply dug, well-enriched soil with good drainage preferably in

Valuable Book for Home Gardeners

THE most comprehensive work on home vegetable gardening under New Zealand conditions yet published is now available from main offices of the Department of Agriculture or from Whitcombe and Tombs Ltd. It is Bulletin No. 342, "The Home Vegetable Garden", by A. G. Kennelly, Vegetable Instructor, Department of Agriculture, Dunedin.

The bulletin, which contains 214 pages, including a detailed index, is well illustrated with diagrams and photographs. Apart from sections on such topics as preparation of the soil, fertilisers, and composting, the bulletin includes a chapter which deals with all the vegetables likely to be grown in New Zealand in their alphabetical order. There is, too, a very comprehensive section on pests and diseases which should enable gardeners to identify these and take effective preventive or protective measures.

"The Home Vegetable Garden" is 2s. 6d. per copy, post free.

[*Sparrow Industrial Pictures Ltd photo.*
Shoots which grow in the branch axils of tomatoes (indicated by arrows in the illustration) should be removed regularly.

a part of the garden with a northerly or easterly aspect should be selected.

As 1 to 2 dozen plants will usually supply the average family, plants are in most cases purchased from seedsmen. They should be sturdy and well hardened off.

Staking should be done at the time of planting to avoid damaging the roots; firm planting is advocated. Some early protection may be afforded by placing large tins with tops and bottoms removed over the plants immediately after setting them out. Plants should be watered after planting to consolidate the soil around the roots.

Training

Some attention to training may now be necessary with plants already established in the warmer districts. The single-stem method, which is the most popular in the home garden, consists simply of removing the small shoots which form in the axils of the branches. (The axil is the place where the branch grows out from the main stem.) These shoots should be removed regularly and certainly before they become more than 1in. long. When growth is steady their removal every 10 to 12 days is necessary and these intervals usually coincide with stages at which tying up is necessary.

In districts where late blight, stem borer caterpillars, or other caterpillars are troublesome it is advisable to apply Bordeaux mixture or a suitable copper fungicide plus D.D.T. To prepare the Bordeaux use 4oz. of bluestone and 5¼oz. of hydrated lime to 4 gallons of water; add ½oz. of D.D.T. 50 per cent. wettable powder.

The first spray should be applied about 10 days after the plants have been set out. Applications should be repeated every 2 to 3 weeks, according to the severity of the disease and weather conditions, until the crop is fully grown.

When the first flowers appear plants may be given a supplementary dressing of a balanced fertiliser mixture at the rate of 2oz. per plant every 3 weeks during the fruiting season.

Varieties

Popular varieties of tomatoes are:—

Dwarf: South Australian Dwarf Red, Tatura Dwarf Globe, and Pearl Harbour.

Tall: Potentate, Best of All, Market King, Supreme, and Abundance.

Turnips

Another sowing of turnips should be made this month. Seed can be sown in most districts in spring, and successional sowings should be continued until February if conditions do not become too dry. Turnips do best in moisture-holding soils such as free loams rich in organic matter or sandy or peat soils with high water-tables.

The crop is likely to fail in the hotter part of the year, if rainfall is low, on soils such as stiff clays or those that dry out quickly. For this reason a plentiful supply of water should be available and used when necessary.

Turnips are fairly tolerant of acid conditions, but lime should be applied if the soil is acid, as the crop is liable to club-root disease, and the reduction of acidity is important in control of the disease. The only fertiliser which should be needed in most home gardens is superphosphate; 2oz. per square yard should be applied.

The seed-bed for turnips should be of a fine tilth and the seed sown thinly ½in. deep with 12 to 15in. between rows. With good growing conditions different varieties of turnips mature in from 42 to 84 days.

Varieties having varying maturity periods are: Early White Milan (6 weeks), Milan Purple Top (6 to 8 weeks), and Golden Ball, also known as Orange Jelly (9 to 12 weeks). The last stands well and is especially suitable for summer and autumn sowing.

GRADING POINTS FOR EXPORT BUTTER AND CHEESE

Leading Factory Averages for Year Ended July 31, 1951

Contributed by the DAIRY DIVISION

BUTTER-MANUFACTURING companies which obtained an average grade of 93.75 points or more and cheese-manufacturing companies which obtained an average grade of 92.75 points or more during the year ended July 31, 1951, are listed below in order of merit. Of the total listed, 30 butter factories are in the North Island and 4 butter and all the cheese factories are in the South Island.

Creamery Butter

Company	Registered number	Brand	Tonnage graded	Average grade points	Grading port
Westland	145	Westland	120	94.365	Lyttelton
United	1296	Whariti	249	94.332	Wellington
Konini	1203	Konini	529	94.240	Wellington
Kaikoura	302	Kai	108	94.189	Lyttelton
Raetihi	717	Raetihi	251	94.147	Castlecliff
Wairoa	1345	Wairoa	141	94.141	Hastings
Rodney	394	Rodney	573	94.120	Auckland
Awahuri	664	Red Rose	761	94.087	Wellington
N.Z. Dairy (Ngatea)	291	Anchor	1949	94.057	Auckland
Kia Ora	926	Kia Ora	589	94.042	Gisborne
Kuku-Manakau	905	Ohau	378	94.015	Wellington
Cheltenham	3	Pakeha	1247	94.004	Wellington
Okitu	1270	Okitu	80	94.000	Gisborne
Cambridge	1239	Cambridge	1955	93.997	Auckland
Collingwood	1254	Golden Hills	301	93.973	Wellington
Kaipara	794	Kaipara	1492	93.966	Auckland
Wangaehu	1326	Wangaehu	508	93.961	Castlecliff
Matakana	1375	Matakana	599	93.942	Auckland
N.Z. Dairy (Tuakau)	1320	Anchor	3310	93.939	Auckland
Inter-Wanganui	6	Inter-Wanganui	60	93.915	Lyttelton
Ruawai	66	Ruawai	2069	93.904	Auckland
Rangitikei	1360	Rangitikei	631	93.902	Castlecliff
Taihape	488	Tikapu	165	93.882	Castlecliff
N.Z. Dairy (Frankton)	1510	Anchor	3050	93.871	Auckland
Maungaturoto	1407	Otamatea	2506	93.866	Auckland
Rangitaiki Plains	133	Rangitaiki Plains	5882	93.843	Auckland
Mercury Bay	485	Mercury Bay	690	93.833	Auckland
Murchison	1888	Airship	96	93.831	Lyttelton
Tolaga	1007	Tolaga Bay	178	93.830	Gisborne
Masterton	1307	Masterton	620	93.818	Wellington
Golden Bay	146	Sovereign	664	93.815	Wellington
N.Z. Dairy (Waimauku)	332	Anchor	1086	93.779	Auckland
Moa Farmers'	341	Inglewood	1731	93.772	New Plymouth
N.Z. Dairy (Morrinsville)	415	Anchor	3789	93.767	Auckland

Cheese

Company	Registered number	Brand	Tonnage graded	Average grade points	Grading port
Momona	1010	Momona	380	92.931	Dunedin
Seaward Downs	702	Seaward Downs	548	92.891	Bluff
Mataura	38	Mataura	430	92.864	Bluff
Tokonui	656	Tokonui	61	92.821	Bluff
Wright's Bush	206	Wright's Bush	356	92.801	Bluff
Mokotua	67	Mokotua	184	92.782	Bluff
Takamatua	33	Takamatua	134	92.771	Lyttelton

Culture of Peaches and Nectarines

THE outstanding feature of the peach and the nectarine is the total dissimilarity in appearance of the two fruits despite their close relationship in other respects. Their history and culture are described in this article by W. S. Kemp, Orchard Instructor, Department of Agriculture, Alexandra, the second part of which will appear in next month's "Journal".

[*National Publicity Studios photo.*

PEACHES and nectarines are distinct only in outward appearance of the fruits, as both belong to the species *Prunus persicae* and the trees are similar in appearance, growth responses, and bearing habits.

The fruit of the nectarine is free from the downy covering found on the peach; it is usually smaller and is richer in flavour and aroma when fully mature. In effect the nectarine is a smooth-skinned peach. Both kinds of fruit have freestone and clingstone varieties; the flesh of either may be yellow, white, or red.

Instances are known of nectarines growing from peach seed and vice versa, of peach trees producing nectarines by bud sports, and nectarine trees producing peaches in a similar manner.

The origin of the nectarine is unknown; mention of it was made in writings 2000 years ago, beyond which its identity merges with that of the peach.

The peach is believed to have originated in China and travelled westward via the trade routes to Persia, from which country it appears to get the specific part of its name, and on to Greece, Italy, and eventually through Europe and the rest of the world, its popularity increasing as it spread.

Because of their similarities the peach and the nectarine will be classed as one in the remarks that follow, nectarines being specifically mentioned only where there is any variation, such as in the description of varieties.

The two fruits are self fertile and their culture is not beset with pollination problems experienced with many other kinds of fruit. Pollen has only to pass from stamens to stigma in each flower and not from variety to variety as with many self-sterile kinds of fruit. Though no instance of pollen incompatability in the peach and nectarine is known, there are cases of male sterility as with the peach variety J. H. Hale, which requires pollen from another peach variety to set good crops of fruit.

Usually, unless damage to blossom is caused by climatic conditions, disease, or other factors, fruit sets freely and systematic thinning of the young fruit is necessary to obtain fruit of marketable size.

In New Zealand the peach is second to the apple in the number of trees planted in commercial orchards, but the nectarine is of minor importance in most fruit-growing areas.

Auckland, Hawkes Bay, and Central Otago are the main peach-producing districts, smaller quantities being produced in many other parts of the Dominion.

As peaches and nectarines are highly perishable, close proximity to markets or suitable transport facilities to enable the fruit to reach the consumer in good condition is most important in deciding where areas should be planted.

Selection of Site

In choosing a location the prospective grower should first consider these main points: Climate, water supply, soil, and transport and marketing facilities.

The area should be reasonably free from spring frosts, and rain during the blossom period is also a disadvantage, as it favours the development of fungous diseases such as brown rot. Both the fruit and the tree benefit from fairly high temperatures, plenty of sunshine, and low humidity during the growing season. During the dormant season temperatures must be low enough to break the rest period or prolonged dormancy may result. Many varieties require 1000 hours at below 45 degrees F. and trees do best when these conditions obtain. The Mayflower peach is an example and in southern districts Mayflower is the main first-early variety, but it has not proved suitable in districts with a milder winter. Overseas authorities claim that this variety requires 1300 hours of chilling. Areas subject to fog and high rainfall are also unsuitable for the growing of peaches or nectarines.

Peaches react quickly if deprived of water, although they are also one of the first fruits to be affected adversely by wet or poorly aerated soil. Providing other conditions are suitable, they may be grown in most parts of the country under normal rainfall conditions, but for some districts supplementary irrigation is advisable; in Central Otago it is essential. In irrigated areas care should be taken that excessive irrigation does not cause a rise in the water-table with resultant injury to the tree's roots. A high water-table not only seriously limits root development, making the tree more susceptible to drought conditions, but in areas such as Central Otago may promote the rise and accumulation of alkaline salts in the upper soil layers.

The most suitable soil for peaches approaches the ideal—one in which there is no factor which will restrict tree and, in particular, root growth. Such restricting factors as a high or low water-table, impervious soil layers at no great depth, and heavy, compact or very light, open soils are to be avoided. Peaches are most commonly grown on soils of lighter texture than is considered desirable for pip fruits, but are being grown successfully on many soil types. Given adequate supplies of plant foods, especially nitrogen and water, they will also do well on light, open, sandy soils, and these usually produce the best-quality fruits.

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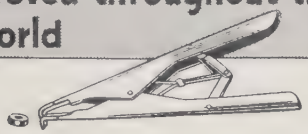

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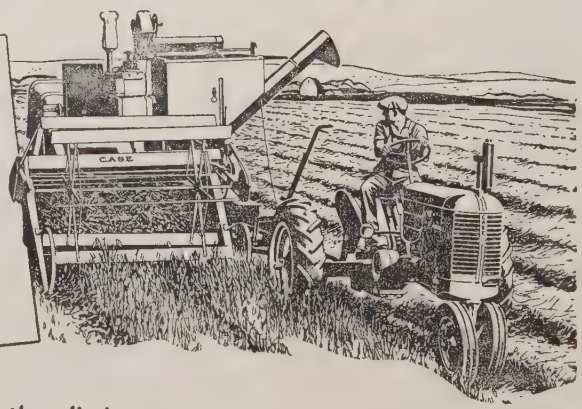

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Shelter

Adequate shelter is essential. Trees exposed to strong, prevailing or cold winds will not thrive and should be protected in such a manner that their welfare will not be threatened. The amount of shelter necessary will vary according to topography and climate. Too much shelter can be as harmful as too little, if not more so. In areas subject to spring frost adequate breaks for air drainage must be left in the shelter belts. The shelter must not be too close nor must it be allowed to reach such a height as to shade the orchard seriously.

Types of shelter used will vary according to the locality. In the north evergreens such as *Pinus radiata* and *Cupressus macrocarpa* and other cupressus species are in general use; in the colder districts deciduous trees such as the Lombardy poplar are favoured.

Selection of Varieties

In any fruit-growing enterprise the selection of varieties is very important. The peach has been in cultivation so long and is grown so widely that there are a great number of varieties to choose from. In North America over 2000 varieties are listed as being grown, but in New Zealand the number is considerably less. Those of commercial significance amount to fewer than 100.

In selecting varieties only those proved suitable for the district should be considered. A variety that gives satisfaction in one district may be unsuitable elsewhere owing to different soil and climatic conditions. A sequence of varieties should be selected with consecutive harvesting periods extending over as long a season as possible in the locality. The number of trees of each variety should not be more than can be conveniently handled during their short harvesting period with the labour and equipment available. Attention to this point will avoid losses caused by inability to handle peak crops because of overlapping harvesting periods of varieties or of other kinds of fruit maturing about the same time.

The home gardener will be interested not only in time and sequence of ripening but in producing fruit of the finest quality. He will tolerate low yields and poor handling ability to obtain other qualities he desires. The commercial grower, however, must choose varieties that will fit into his scheme of orchard operations and produce the best net returns. This point is often overlooked, especially by the home gardener, who assumes that because a variety is popular in commercial orchards it is also the best for his needs.

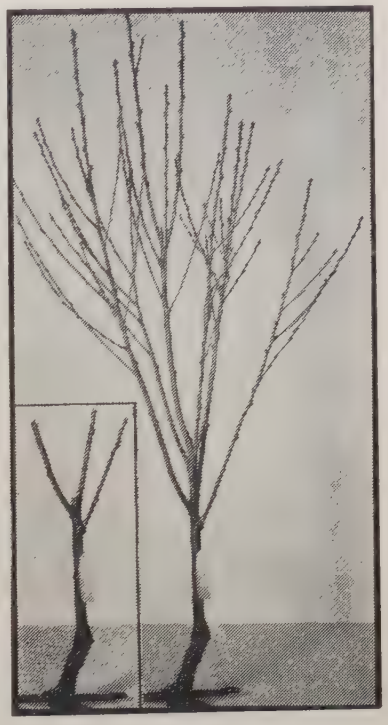
The commercial grower has two main outlets for his product, the fresh-fruit trade and canneries; the latter outlet is important in districts where canning factories are established. For the fresh-fruit trade the desirable characteristics are good colour, size, flavour, and ability to stand handling so that fruit will arrive on the market in an attractive condition. The preference in dessert varieties is for freestone, white- or yellow-fleshed peaches relatively free of down. For canning, firm, yellow-fleshed fruits, preferably clingstone with as little red colour as possible around the stone, are preferred. Any variety popular with both the fresh-fruit and canning trades has distinct advantages.

Propagation and Root Stocks

Fruit growers rarely attempt to produce their own trees. To do so successfully requires much time and care in addition to a skill obtained only through experience in propagating. Generally trees are obtained from a reputable nursery, for it is not practicable for the average grower contemplating establishing a new area to raise the fairly large number of trees usually required. However, the orchardist who requires a small number of replacements annually would find his own nursery a profitable and interesting sideline.

Peaches and nectarines, as with other fruits which do not reproduce true from seed, must be budded on some other stock. The common stock used is seedling peach, and stones are normally obtained from local canning factories or sometimes from overseas. Various plum, almond, and apricot stocks have been tried, but in no case have they proved more suitable than peach.

Nursery trees should be ordered early to ensure obtaining the desired varieties. On delivery trees should be unpacked and, if they cannot be planted at once, heeled in by placing them in a trench side by side at about the same depth at which they grew in the nursery. Moist soil should be placed around the roots and firmed; then the trench should be filled in with loose soil. The position chosen must be well drained and cool and the soil must not be allowed to dry out. Trees may be held in this way for several weeks.



[*Sparrow Industrial Pictures Ltd. photos.*

A yearling peach as received from the nursery. Inset—The same tree pruned back to three well-balanced shoots.

Recommended Varieties

The following are recommended varieties of nectarines and peaches listed in order of their approximate harvesting periods—from early January to late March for nectarines and from early December to mid-April for peaches:—

Nectarines

John Rivers
Early Rivers
Mrs. Dr. Chisholm
Cardinal
Hunts Tawny
Goldmine
New Boy
Stanwick
Victoria
Youngs Seedling
Fripps Late Red

Peaches

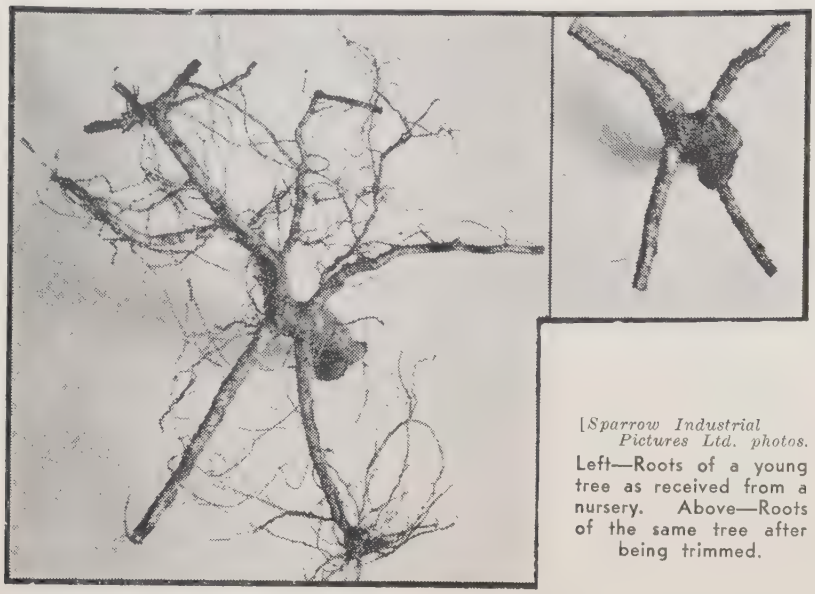
Sneed
Le Vainqueur
Mayflower
Briggs Red May
Highs Early Canada
Ulatis
Anzac
Rosebud
Triumph
Hales Early
Mamie Ross
Wiggins
Carman
Ideal
Peregrine
Zerbes
Paragon
Foster
Kalamazoo
Stark
Eclipse
A. I
Kia Ora
Meteor
Muir
J. H. Hale
Marys Choice
Elberta
Late Crawford
Black Boy
Akarana
Gold Dust
Lippiatts Late Red
Goodmans Choice
Hobbs Late
Lady Palmerston
Golden Queen
Golden King
Salwey
Pullars Cling
Kahuranaki

Preparation of Site

The future success of the planting depends to a large extent on the initial preparation of the land. This will vary according to the state of the area to be planted and whether irrigation is considered necessary.

Where irrigation is required the land may possibly need grading and levelling to distribute the water, and the proposed irrigation system must also be planned. Where grading is necessary care should be taken to see that no part of the area has the topsoil removed to such a depth that infertile patches result.

If the land to be planted is in a virgin state, it should first be cleared and all growth that will not rot down rapidly destroyed by burning. The area should be ploughed in autumn and allowed to fallow during winter. In



[*Sparrow Industrial Pictures Ltd. photos.*

Left—Roots of a young tree as received from a nursery. Above—Roots of the same tree after being trimmed.

early spring it should be cross-ploughed and, if necessary, a dressing of carbonate of lime applied, after which it should be well broken up, either with discs or rotary hoe, before being planted.

Where possible the area to be planted should be sown with a cover crop, preferably a legume, the season before planting. This will improve aeration, fertility, and the mechanical condition of the soil when the crop is turned in during the winter before planting.

Planting

Generally orchards are planted on the square system, in which trees and rows are the same distance apart. Distances vary, but those in most general use are 18ft. square, which requires 135 trees per acre, and 20ft. square, when 109 trees per acre are required.

Some growers prefer the distance between the trees to be less than that between the rows. This makes it easier to take equipment through the orchard before and during harvesting. Distances such as 16 or 18ft. between trees and 20 or 22ft. between rows require 136 and 110 trees per acre respectively—much the same as for the square methods in general use.

For sloping areas where heavy falls of rain may occur or where irrigation is to be used growers are considering the adoption of contour planting to assist in soil conservation.

In deciding what planting distance to adopt a number of factors must be considered. If strong-growing trees are planted too close, overcrowding will occur; if they are too far apart, the best use is not being made of the land and maximum crops per acre cannot be obtained. Varietal characteristics have a bearing on tree size, but it is not usually practicable to vary distances to suit varieties. The aim should be to select that distance which, taking all factors into consideration, will allow the trees sufficient space for full development and at the same time produce the best net return per acre. In deep, fertile soils the most suitable distance will be 20ft. or even more, but for most soil types 18ft. gives the best results.

Interplanting

In some districts peaches are used as fillers between apples and other fruits to secure an income from an area before the other fruits on it are in full production. This has some disadvantages, as the soil types suitable for other fruits do not always suit peaches, and the varying spray programmes necessary often cause complications. Furthermore, there is the tendency to leave the fillers too long, with the result that the main fruits do not make good growth and production from them is affected.

Setting Out Trees

When the land is prepared and the trees are on hand the area to be planted should be lined out and pegs placed to mark the positions of the trees. At each peg site holes should be dug wide enough to take the root spread and deep enough to allow the trees to be set at the same depth as in the nursery or slightly lower.

Before the tree is planted any damaged roots should be cut back to sound wood. A slight mound should be left in the bottom of the hole so that when the young tree is planted the roots will be directed downward. With the tree in position, the soil should be worked down well among the roots and firmed to ensure compactness. A handful of fertiliser mixed in with the soil as it is replaced will assist in giving the tree a quick start into growth.

It is most important that the roots should not be allowed to dry out at any stage and that the tree should be held firm once it is planted. If strong winds are likely to be experienced and shelter is inadequate, staking may be necessary for the first few years.

Pruning Young Trees

Pruning has been described as the art of changing the natural habit of the fruit tree to improve its value as a cropping unit by securing more regular and larger crops of quality fruit. The aim of the pruner should be to produce a vigorous, strong, healthy framework capable of carrying heavy crops without breakage of leaders and to secure a well-shaped tree which is convenient and economical in orchard management.

As soon as the tree is planted it should be pruned not only to shape the future framework but also to provide a balance between the top and the roots which were reduced when the tree was lifted from the nursery. Pruning should never be done before planting, as there is always danger of buds being damaged during planting.

Young trees are generally headed back in the nursery and are well provided with growths from which two or three well-spaced, upright, sturdy shoots can be selected as the start of the future framework. All other shoots should be removed. The selected shoots or leaders, as they are commonly called, should be shortened back to about one quarter of their length. They should be cut back to suitable side buds so that two well-placed shoots should arise from each leader.

Pinching Out Unwanted Growth

In training young trees much good can be accomplished by pinching out unwanted growth in early summer, especially in the first few years of development. Provided the newly planted trees make normal growth, they will send out many unwanted shoots. The trees should be gone over regularly in early summer and the desired framework shoots selected. The undesired growths can be subdued by pinching out the terminal or may be rubbed out entirely. If the shoots can be rubbed out without seriously reducing leafage, that is the better procedure to adopt. It will prevent the formation of basal buds which, if allowed to develop, will only result in further superfluous growth next year.

By the practice described vigour is directed into the shoots which it is intended to retain. Should the trees fail to make good growth, little if any pinching out should be done and the practice should never be adopted to the detriment of leafage.

Pruning during the first winter after planting will consist of selecting up to 5 leaders from the strongest and best-placed growths, the remainder being removed. The selected leaders should be shortened back to about one third of their new growth and pruned to outside buds to increase the spread of the tree. However, if the desired number of leaders is not obtained, as will often be the case, pruning to side buds will still be necessary to obtain new leaders in the desired positions.

After 2 years' growth the main framework consisting of up to 7 leaders should be taking shape. The pruning is again the same as in the

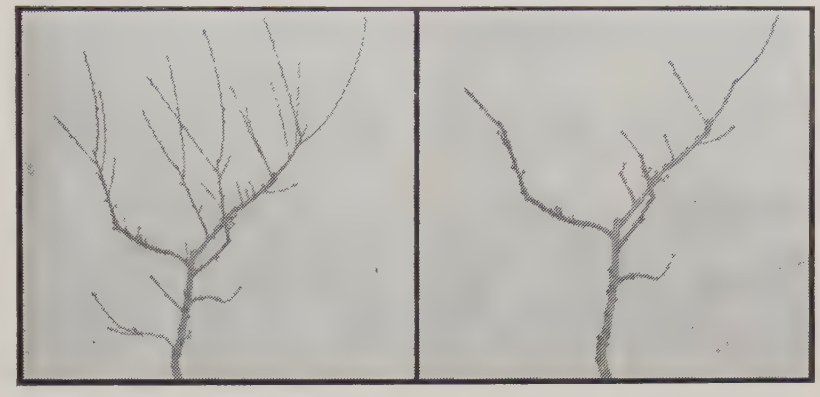
previous winter. Once the leaders have been selected all other growth should be cut away to an outside bud and the leaders shortened back to about one third. In making the selection of these buds care must be taken to keep all leaders about the same height; otherwise there is a tendency for one or more leaders to become stronger than the rest. If this occurs, the weaker leaders should be cut slightly longer than the others so that they may be given a chance to catch up or alternatively the stronger leaders can be pinched back in the summer as a check.

Variations in Treatment

It is in the third and subsequent winter after planting that variations in the treatment of the trees will occur, according to the fruit-growing area in which they are established. In districts such as Central Otago which experience low winter temperatures the trees are slower to begin cropping and the pruning will still follow the lines of the previous years. In the warmer districts, where growth is quicker and the trees have a shorter rest period, the trees crop earlier and a different style of pruning is usually adopted once a strong rooting system is established and the framework formed. The selected leaders are not shortened back, but are left uncut for several years. Most of the light lateral wood on these leaders is removed, but some is allowed to remain uncut to produce fruit if the tree size is sufficient to warrant such procedure.

Pruning Bearing Trees

No fruit responds to correct pruning more satisfactorily nor declines more rapidly with neglect than does the peach. This is mainly because of its fruiting habit. The fruit buds of the peach are generally borne on the lateral wood shoots produced the previous season and occasionally, particularly in southern districts, on short, spur-like twigs. Where the tree is making vigorous growth triple buds (two fruit buds with a leaf bud between) will often occur. Where the growth is poor, however, single fruit buds are usual. Their distribution on laterals depends on the growth and bearing habit.



Peach lateral before being pruned (left) and after being pruned (right). Note the short, spur-like growth. Such growth occurs in southern districts, but is rare in northern areas.

By the time trees have reached the bearing stage a strong, well-shaped framework should have been formed. The aim from now on should be to regulate the crop and its distribution throughout the tree by pruning so that a balance between fruit and vegetative growth is obtained.

In general the pruning of bearing trees consists of the removal of all spent wood which has borne fruit the previous season and the thinning out of new lateral growth, the endeavour always being to keep the fruiting wood as close in to the leaders and main laterals as possible. Fairly heavy annual pruning is necessary to maintain tree vigour and it is usual to remove more than half the lateral growth. Failure to thin out this growth sufficiently is usually the cause of the lower parts of the tree becoming bare of fruiting wood. If this happens, leaders should be headed back enough to cause new growth to break out lower down and so refurnish the tree. The closer the fruit to the ground, taking into account cultivation and other cultural operations, the more economical will be the thinning and harvesting of the crop.

As with the young tree, treatment of the bearing tree varies in different localities. In northern districts the lateral wood which remains for fruiting is seldom cut back and the permanent fruiting laterals or arms are heavier and extend further from the leaders, which are usually fewer. Leaders are seldom tipped, being cut back to a side shoot at the height at which it is desired to keep the tree.

In southern districts pruning is harder, laterals left for the production of fruit are normally cut back to 4 or 5 buds, and the leader growth is cut back annually. On those varieties known as tip bearers this practice is varied, fruiting laterals usually being left uncut while unwanted ones are cut out.

Type of growth obtained due to the different climatic conditions is mainly responsible for this variation in pruning. In Central Otago, with its light rainfall and low winter and high summer temperatures, growth is usually not as heavy as in warmer districts with a higher rainfall. The lateral wood ripens better, fruit bud development is greater, and shoots are clothed with fruit buds right down to the base, except in the case of tip bearers. Trees take longer to begin cropping, but their economic commercial life is also longer—25 to 30 years in Central Otago as against 10 to 12 years in the Auckland district.

Tip-bearer-type peach variety before being pruned (left) and after being pruned (right).

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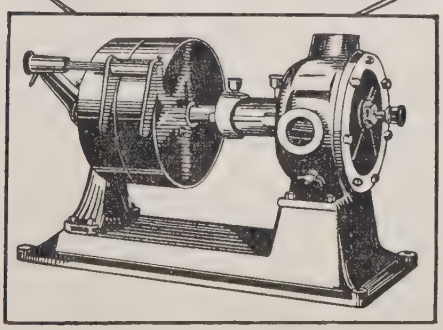

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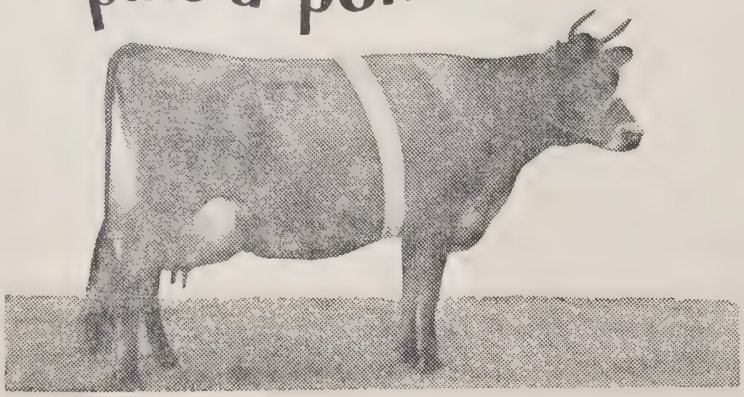

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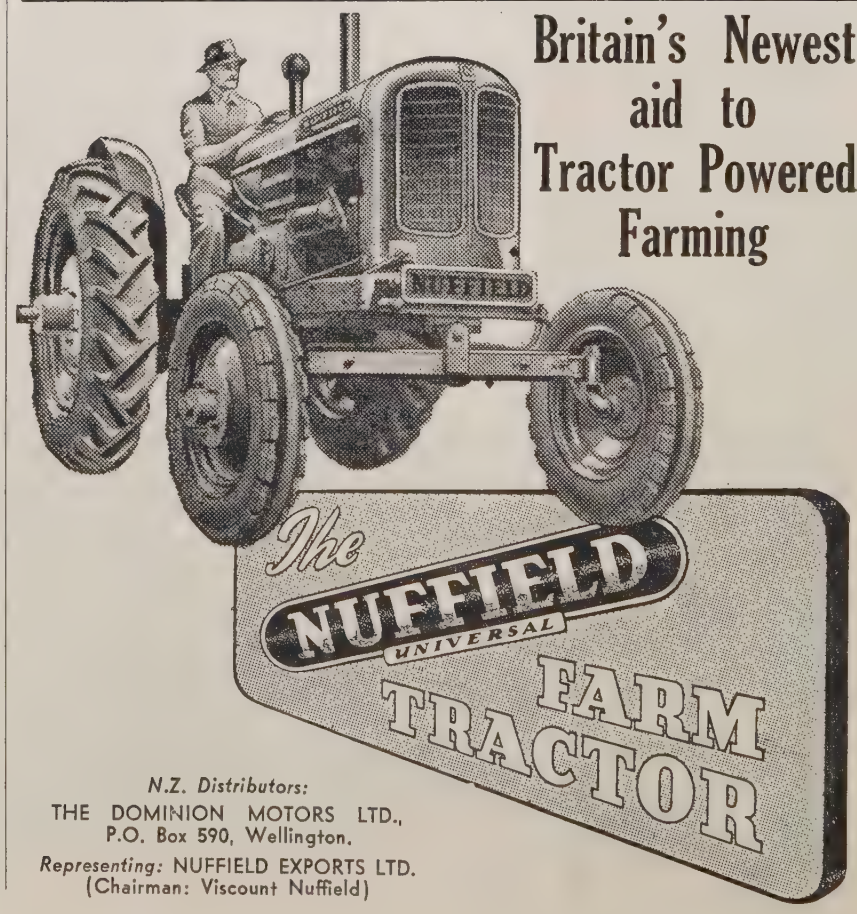

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Cultivation

Normal reasons for cultivating are to aerate the soil, to remove weeds and weed competition, to aid absorption and retention of moisture, to prepare a seed-bed for cover crops, to incorporate cover crops or manures, and to make easier subsequent orchard operations such as irrigation, spraying, or harvesting.

The types of equipment used will vary according to soil type, growers' preference, and motive power available. On light, open soils the rotary hoe and spring-tooth cultivators are very suitable; in the heavier soils the plough, offset discs, and disc harrows are preferred.

Amount of cultivation necessary will depend on soil type, climate, and other cultural operations undertaken. Where summer temperatures are normally high cultivation should be reduced to a minimum and be as shallow as possible to prevent excessive burning out of the humus content of the soil.

When the soil is wet cultivation should be delayed until the surface has dried out sufficiently to minimise the dangers of compaction. In no case should cultivation be deep enough to damage the roots seriously.

Catch Cropping

Often during the first few years of establishment of peaches or nectarines a catch crop is grown as a source of additional income. In choosing such a crop the grower should consider the possible effect on the development of his young trees. Usually an orchard is planted because it is considered that fruit will ultimately yield a greater income than certain other crops; the sooner the trees reach full bearing the sooner will such income be realised.

Any catch crops grown should hinder as little as possible the rapid development of the young trees either by undue absorption of soil nutrients and moisture or through introduction of pests and disease. Tomatoes, for instance, are hosts of verticillium wilt, and though this fungus does not readily attack peaches and nectarines, the trees should not be unnecessarily exposed to the danger of becoming affected. Catch crops will also deplete the soil of moisture and nutrients, but provided this fact is recognised and suitable provision made, no ill effects should result.

Cover Crops

To increase soil fertility and maintain humus content the growing of annual cover crops for incorporation in the soil is recommended, especially during the early years of tree establishment. Once the trees have reached maturity establishment of cover crops may become difficult owing to the shading effect of the trees. Where this position arises the practice of using hay and other organic materials as a mulch which is worked into the soil in autumn is growing in popularity.

Any cover crop planted should be one that will give the maximum amount of bulk. Blue lupin is favoured in most localities, for besides producing a good bulk of green matter it is also a nitrogen provider. In general leguminous plants are used because they serve a double purpose; but others are also used, especially in combination with legumes or on their own, when it is desired to spell the ground from legumes.

A growing practice in Central Otago, especially where adequate irrigation water is available, is the sowing of annual summer swards of grasses and clovers, which are turned under in autumn.

Four-year-old peach tree before being pruned (left) and after being pruned (right).

Fertilisers

The peach is most sensitive to nitrogen shortage and responds to applications of this element where other fruits do not. Excessive application of nitrogenous fertilisers is to be avoided, however, as it has the effect of delaying ripening and produces less attractive fruit. Rank growth is produced, with the result that much of the wood does not ripen. In general a mixture containing 3 parts of nitrogen, 2 parts of phosphate, and 1 part of potash is recommended, though the mixture will vary according to soil type.

Overseas and New Zealand experiments show that the main response has been to nitrogen. In one Nelson experiment on a soil type well supplied with available phosphate and lime, nitrogenous fertilisers used at the rate of 3lb. per tree gave an average annual increase of 1 bushel of fruit per tree. The result of these experiments points clearly to the importance of nitrogen to the peach and indicates that a dressing of at least 3lb. per tree on orchards in full bearing is desirable.

The fertiliser may with advantage be divided into two applications, especially on light sandy soils, the first before blossoming and the second before stoning, as it is at these two periods that the greatest demand is made upon the trees' resources.

Frost Protection

Although there is a growing belief that autumn frost injury may be responsible for some troubles experienced in the growing of peaches, particularly in Central Otago, the main danger is from spring frosts. As the flower buds open they become increasingly susceptible to injury. The young fruits are even more tender than the flowers and are subject to damage until about ½in. in diameter.

The use of firepots burning oil has been effective in preventing damage by frosts up to 12 degrees F. These pots are used at the rate of one 10-pint pot per tree. An alarm thermometer is required to warn the grower of a dangerous fall in temperature during the night, and several other thermometers placed at various points through the orchard are necessary for checking temperatures after the pots have been lit. Some means of quickly refilling firepots is essential when frosts are of long duration.

The question of whether or under what conditions frost protection can be profitable is difficult to answer. Only the grower can decide whether the higher returns likely to be realised over a period of years will compensate for the cost of installation and subsequent maintenance of firepots.

The cost of equipping an area of 5 acres for frost-fighting purposes would be about £130. This is made up as follows:—

	£	s.	d.
600 pots, 10-pint capacity ..	87	13	0
1 frost alarm complete ..	16	10	0
3 orchard thermometers ..	5	0	0
2 torches for lighting pots..	1	10	0
1 firepot filler gun and hose	7	10	0
	£118	3	0

Oil for frost fighting costs £3 9s. per drum (44 gals.) and a pot will burn for about 4 hours.

In addition some means of quickly refilling the pots is necessary. Some portable spray outfits are being used for this purpose and can be adapted for about £8.

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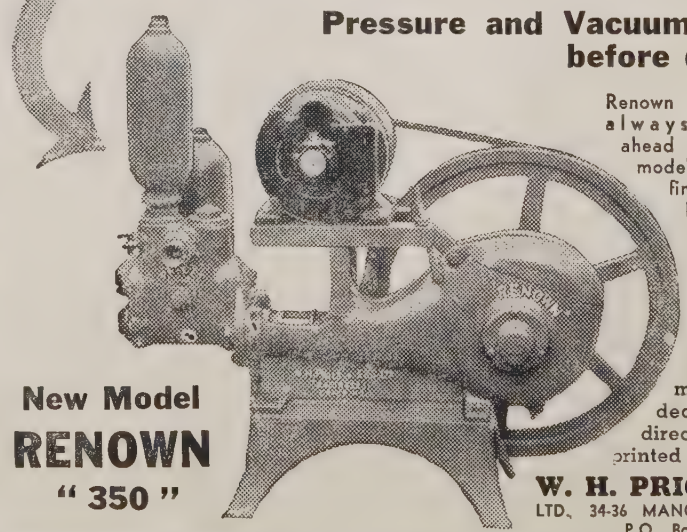

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Fruit Thinning

The general tendency of the peach is to set more fruit than the tree can mature satisfactorily. Judicious pruning will save a good deal of the labour of thinning, but normally thinning becomes an essential orchard practice. Not only does it increase the size of saleable fruit, but it decreases the risk of breakage of branches through overloading. Thinning is usually deferred until after the stoning-period drop or until risk of damaging frost is past, but this is not always practicable.

Varieties will normally be thinned according to the time they mature, those maturing first being the first to require thinning. However, this will vary according to the crop prospects, those showing sign of heavy crops being dealt with first. The main essential is to see that any thinning required is done as soon as possible and to the extent necessary; otherwise its benefits are largely nullified.

The number of fruits left on each lateral and the distance between them are largely determined by the vigour of the tree and the ultimate fruit size desired. The size obtained is mainly dependent upon the leaf area to feed the fruit, and a balance between fruit and leafage is essential. It is usual to leave 1 or 2 fruits, depending on the length of lateral, but the aim should be to space fruits several inches apart. Fruit on the lower parts will require wider spacing than that in the upper parts of the tree, as the lower branches are in a less favourable growing position.

Harvesting

Fruit of the best quality is produced only when it is allowed to mature on the trees. It is in the period preceding full ripeness that the fruit develops its characteristic colour, aroma, and taste, while the weight increases greatly.

When fully ripe the fruit is soft and easily bruised; therefore to market it in suitable condition it must be harvested somewhat in advance of full maturity. How much in advance will depend on the length of time between picking and placing the fruit on the market.

There is no excuse for picking fruit in an immature condition. The aim should be to supply the consumer with fruit of the highest possible quality; this is the surest way of keeping patronage and increasing consumption.

When harvested, fruit should be fully developed and almost fully coloured, and the flesh should be firm enough to withstand handling. Every possible care must be taken from time of picking until it reaches the consumer.

Nectarine lateral before being thinned (left) and thinned (right).

Various kinds of receptacles are used for picking, their main essential being that they are of rigid construction which will give adequate protection to the fruit. The best arrangement for general purposes is a harness strapping around the picker which will carry the 7in. x 7in. x 18in. case. The fruit is picked into this and the cases when filled are placed on the vehicle which will carry them to the packing shed.

The fruit is next sorted into grades and then either sized by hand or put over a grading machine, where it is mechanically sized. The grades used vary with the individual grower's ideas, but there are usually two or three. The aim should be to set a high standard and keep to it; the condition of the product on the market floor sets the buyers' values to a large extent.

Two types of containers are used for marketing, the tray, which is 11½in. x 18in. x 2½in. or 3in., and the 7in. x 7in. x 18in. case. Trays are used mostly for the higher-quality dessert fruit and three or four are wired together to form a crate. The case, which holds 18 to 20lb. of fruit, is most commonly used.

Packing

With the trays, which hold only one layer of fruit, the normal method is to place the fruit stem end down, but size and shape of the variety will determine whether this method or that of placing fruit cheek down is used. In the 7in. x 7in. x 18in. case the diagonal pocket pack is normally adopted. With this pack each fruit rests in the pocket formed by the fruit in the layer beneath, thus reducing the risk of damage which might occur in transit. Various materials are used as protective layers at top and bottom of the case, wood wool or shredded paper being the most common, and an all-round wrap of paper is used as a case liner. In trays a paper liner is used with wood wool or shredded paper placed between the fruits to keep the pack firm.

Pre-cooling and Cool Storage

Labour shortages and the effects of the shorter working week have resulted in a growing interest in cool-storage facilities. A number of growers have had small chambers built next to their packing sheds so that fruit may be pre-cooled and held for short periods (over weekends or holidays or during periods of low prices). These small stores have proved very beneficial to stone-fruit growers and the number installed increases annually.

The size of the chamber varies according to the requirements of individual growers, but as most usually grow other kinds of fruit also, the popular size is one which will serve all purposes; it is generally a chamber with a capacity of about 1000 bushels. Where stone fruits alone are grown a chamber of about half this size would be adequate in most cases.

Where pre-cooling is adopted fruit should be placed in the chamber as soon as possible after harvesting and may be stored at from 32 to 34 degrees F. for several weeks, depending on the storage life of the variety. However, because flavour develops inadequately and fruit held for too long may break down rapidly on removal, care must be exercised when operating cool stores.

Although the initial cost of installation is high, results to date indicate that these chambers have proved very valuable to the enterprising growers who have installed them.

TOTALS OF PEACH AND NECTARINE TREES

The Dominion total of peach trees increased from 234,174 in 1937 to 305,314 in 1950 while for the same years the number of nectarine trees decreased from 35,576 to 33,080.

The following are totals for the principal fruit-growing districts:—

District	Peaches		Nectarines	
	1937	1950	1937	1950
Auckland and Hamilton ..	69,081	79,515	6,562	3,206
Hastings and Gisborne ..	50,798	98,563	6,666	6,935
Nelson and Blenheim ..	38,383	43,074	2,937	2,322
Christchurch	8,505	8,775	3,028	1,648
Central Otago	59,217	68,390	14,601	17,440

Care of Livestock during November

Contributed by the Animal Research Division

DRY EWES

IF dry ewes have not already been removed from the flock, they should be separated immediately. It is a good plan to shear them and, during shearing, they should be inspected carefully for udder abnormalities. All ewes whose udders were empty at lambing and ewes with diseased udders, damaged teats, very large teats, very small teats, or badly placed teats should be culled. Dry ewes with defective mouths and old ewes which did not have a lamb this year should also be culled. Dry ewes which are retained should not be allowed to get too fat during summer. If kept in hard store condition, they are more likely to hold when mated next autumn.

CONTROL OF FAT-LAMB PASTURE

Pastures on which ewes and lambs are grazing should never be allowed to become rank. If pastures are getting too long, they can best be controlled by cattle. Yearling beef cattle soon become quiet and they can then be run with ewes and lambs even in small paddocks.

HILL STATIONS

Where bidi-bidi comes away early, and is troublesome, ewes should be shorn toward the end of November. Run cows not required for breeding should be culled. Calves should be branded and handled as opportunity permits. In warmer districts put bulls out with the breeding herd. Where water is not laid on attention should be given to dams and springs so that water supplies will be plentiful during the hotter weather.

MATING OF DAIRY COWS

Before each cow is mated two open heat periods or an interval of at least 30 days should be allowed after calving. Cows mated before this period are less likely to get in calf, and the chances of contaminating the bull are increased. Hand mating should be practised and accurate records kept showing the bull used and the dates of all services. Should breeding trouble occur, these records will be of considerable assistance in arriving at a correct diagnosis.

GRAZING MANAGEMENT OF DAIRY PASTURES

An increasing number of farmers are using the electric fence for feeding off autumn-saved grass. This practice could well be extended to the grazing management of spring pastures. It is a convenient and economical method of obtaining closer subdivision and makes possible more efficient utilisation of available feed. In addition the longer spell between grazings encourages grass growth and leaves more available for conserving as silage or hay.

CARE OF PIGS

Dry sows should have access to good pasture, and in addition should receive from 2 to 4 gallons of milk per day, depending on their condition. They should be kept thriving, but not be allowed to become too fat. Only as many of the spring litters for baconers as can be fed adequately should be kept. The remainder should be sold as porkers.

VACCINATION AGAINST CONTAGIOUS ABORTION

Vaccination has reduced the New Zealand average rate of abortion in dairy cows from about 5 per cent. to about 1 per cent. There are, however, still too many dairy farmers who do not vaccinate their calves. Past freedom from abortion is no excuse for not vaccinating, as infection may be introduced into a herd at any time. Although vaccination does not begin until January or February, vaccine should be ordered now, as Veterinarians and Inspectors of Stock have to plan their vaccination itineraries. Late orders make this planning very difficult.

[*Sparrow Industrial Pictures Ltd. photo.*

SHEARING PREPARATIONS

Preparations for shearing should be made now. Attend to sheepyards and scrub out the woolshed. This will reduce trouble from such diseases as blood poisoning, tetanus, and caseous lymphadenitis ("lympho") after shearing. Check over all machinery to see all parts are in good working order. Dag all dirty sheep and shear hoggets, wethers, dry ewes, and rams. When culling sheep, before shearing, pay particular attention to teeth, udder, and dropped belly. On fat-lamb farms ewes are best shorn after one or two drafts of lambs are away.

Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during August and for the same month of 1950 have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:—

BUTTER

Period	Creamery	Tons Whey	Total	% Inc. or dec.	Total tons In store at end of mth.
August, 1951 ..	8,883	113	8,996	—	8,660
August, 1950 ..	9,111	110	9,221	—	9,194
Inc. or dec. ..	—228	+3	—225	—2.440	—534

CHEESE

Period	White	Tons Coloured	Total	% Inc. or dec.	Total tons In store at end of mth.
August, 1951 ..	1,656	—	1,656	—	3,186
August, 1950 ..	1,502	290	1,792	—	5,085
Inc. or dec. ..	+154	—290	—136	—7.589	—1,899

If these figures are converted into butterfat equivalent, there is a decrease of 2.927 per cent. in butterfat for August as compared with the corresponding month of the preceding season. It should be noted that the above figures refer only to butter and cheese graded for export, and that owing to diversions which may take place from time to time, they are not necessarily a true indication of production trends.

Hay Harvest and Pasture Irrigation

Seasonal Notes Contributed by the Extension Division

PREPARATIONS for harvest work and the provision of ample supplies of summer, autumn, and winter supplementary feed should now be finally reviewed. Irrigation offers an assured method of guarding against summer drought, and sprinkler irrigation is being more widely adopted each year by North Island dairy farmers. Summer fallowing, as a preparation for autumn-sown pasture or for the eradication of twitch and other perennial weeds, is a practice worth close attention.

* * *

HAY HARVEST MODERN machinery, particularly the pick-up baler, allows the greatest advantage to be taken of favourable weather for haymaking. All machinery should be checked over before it is required in the harvest field. Points to check on mowers are the cutter-bar lead (about ¼in. per foot of cut), centring (the knife sections should each lie in the centre of a finger at the end of the outward and inward stroke), and alignment of the fingers. Worn ledger plates, fingers, and knife sections should be replaced and lubrication checked over. With hay-stacking machinery particular attention should be paid to parts which affect the safety of workers. Frayed ropes and damaged poles should be replaced and tripping latches may require building up by being welded.

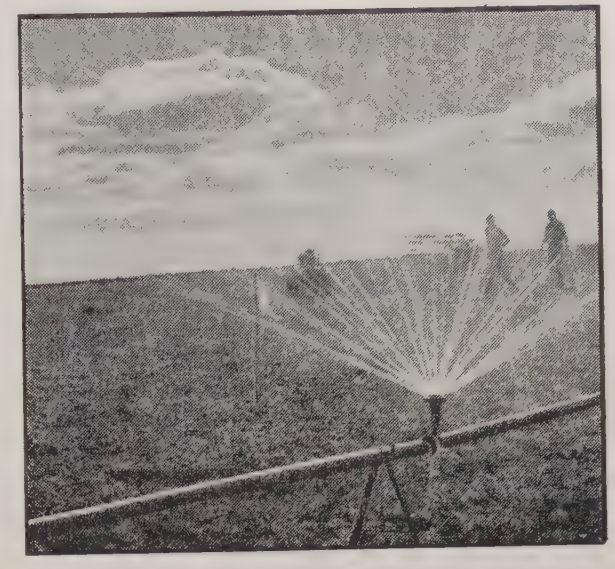
* * *

SPRINKLER IRRIGATION THE PROVISION of summer pasture feed on dairy farms will require about 1 acre under sprinkler watering for every 5 to 6 milking cows, and an area of 12 to 15 acres under irrigation will require a water supply of about 3000 gallons per hour. Suitable supply sources are rivers, small streams, creeks which have a fairly good flow, and small creeks which can be dammed up to provide a reservoir holding at least 15,000 gallons. Shallow wells where the water-table is near the surface also afford a satisfactory supply in some districts. As irrigation plants cost approximately £30 to £40 per acre, it is important to plan each project carefully, particularly in respect to pump, type of spray, and spray lines. High- and low-pressure systems are available; each has advantages and disadvantages. In any initial installation a reasonable margin should be allowed for possible additions to the area to be watered, that is, the pumping equipment or pipe lines should not be working at capacity.

APPLICATION OF WATER Over-watering can be almost as harmful as the use of too little water. Water should be applied no faster than 1in. in 3 hours and about 1½in. should be applied every 10 days. For light soils the total water requirement per month is the same, but lighter and more frequent applications are required, for example, 1in. every 6 or 7 days. Preparations should be completed so that irrigation can be done early in the season. Once the soil is permitted to dry out production declines and a considerable amount of extra water is required to restore soil moisture to optimum level. Irrigated pastures should be grazed in breaks for 2 to 3 hours daily. Pastures should be grazed evenly but not too severely and then spelled until a good lush growth is again available. The routine work of moving pipe lines on a 12- to 15-acre irrigation area takes about 20 minutes every 4 hours.

* * *

INTER-ROW CULTIVATION WEED CONTROL is the most important purpose of inter-row cultivation. The idea that a mulch of dry cultivated soil prevents the evaporation of soil moisture from below is open to question and the cultivation of inter-row spaces for that purpose alone is not justified. Shallow cultivation is best for weed control. The aim should be to cut the weeds just below the growing point and to disturb the soil as little as possible, the lightest of implements being used.



[*Sparrow Industrial Pictures Ltd. photo.*

* * *

SUMMER FALLOW SUMMER FALLOWING before sowing autumn grass is becoming increasingly common, apart from its use for weed eradication. In the development of virgin land the practice is almost essential for the establishment of a satisfactory seedbed for early-autumn sowing, and even in arable districts the benefits from summer fallowing for pasture establishment are worth close attention. A summer fallow gives a satisfactory degree of suppression of both annual and perennial weeds and is generally well repaid in the extra vigour secured from an early-autumn-sown pasture. A suitable arable rotation including a summer fallow is: Old pasture winter fallowed for turnips, turnips followed by rape, rape by wheat, wheat by a catch crop of greenfeed oats or barley, and the land finally summer fallowed and sown in new grass early in autumn. Where rape and turnips are not required peas or linseed may be taken after grass and be followed by wheat.

* * *

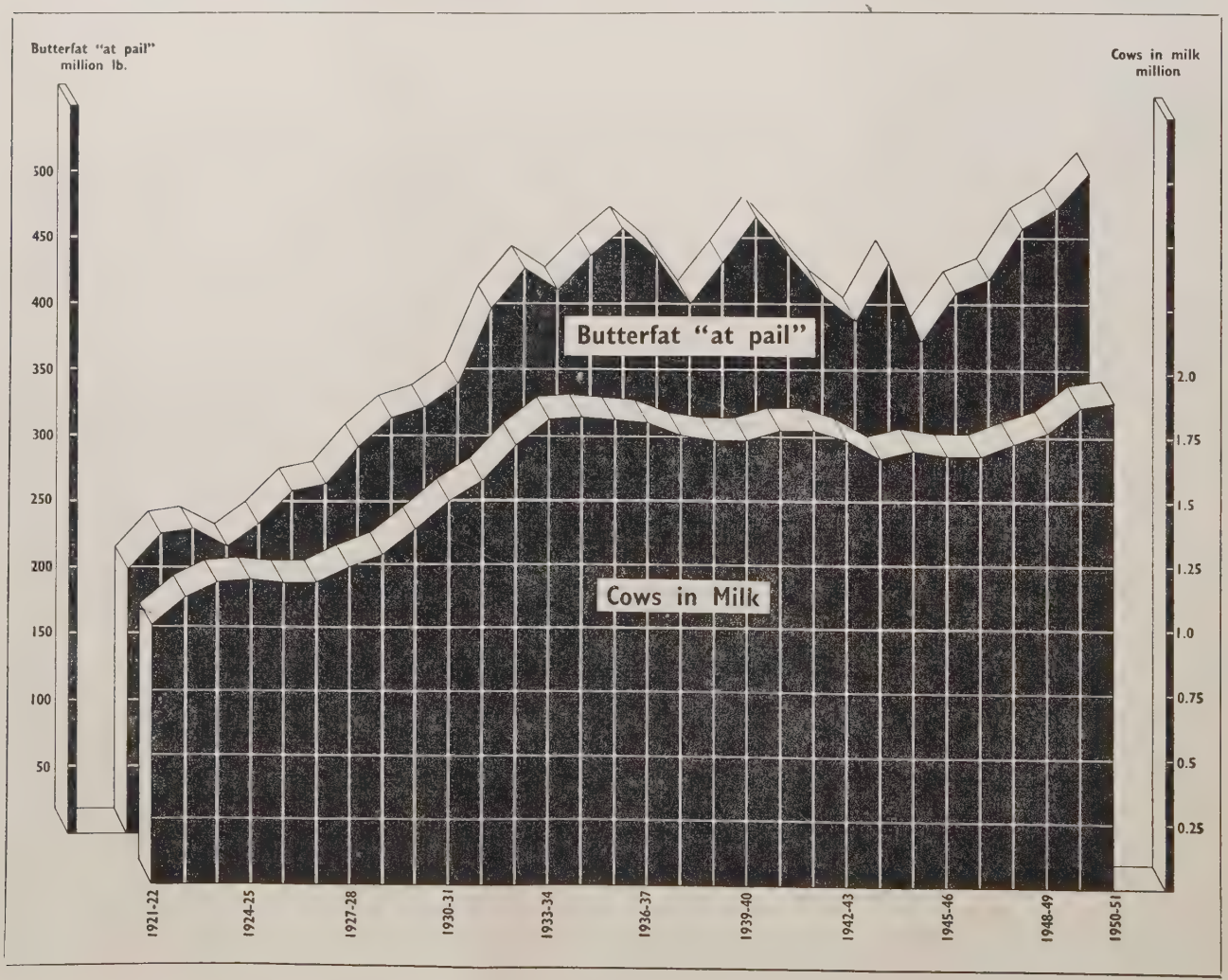
FERTILISERS FOR SWEDES AND TURNIPS SOLUBLE fertilisers are likely to cause germination injury when placed in contact with turnip, swede, and other brassica seeds. Superphosphate can cause injury under dry conditions, but serpentine superphosphate and lime-reverted superphosphate cause no injury and help the rapid establishment of seedlings in face of insect damage and dry conditions when slow-growing seedlings may suffer. No nitrogenous or potassic fertilisers should be sown with the seed, as they both cause germination injury. The best placement is a suitable phosphatic fertiliser in contact with the seed. Broadcasting fertiliser on the surface is not satisfactory, as the fertiliser is out of reach of the crop and when harrowed in it is dispersed and exposed to the full fixing properties of the soil. Depth of placement of bands of fertiliser is important in that with deep placement the fertiliser remains in moist soil where roots can feed upon it when the surface soil is dry. Deep placement of fertiliser encourages deep rooting systems in the early stages of growth and is a protection against drought.

Total Butterfat Production for 1950-51 Sets New Record

THE final estimate of total butterfat production "at the pail" for the season ended June 30, 1951, made by the Extension Division of the Department of Agriculture indicates a record. The estimated total of 499,000,000lb. of butterfat represents an increase of 5.7 per cent. over the record of 472,000,000lb. reached in the previous season.

After a mild winter in 1950 cows came into production in good condition and, with the exception of September, production in the spring months was slightly in advance of the corresponding months for the previous season. There was good distribution of rainfall throughout the remainder of the 1950-51 season in all districts and high production was maintained. This led to early expectation of a record season.

The graph shows that total butterfat production has increased more rapidly than has the number of cows in milk. This may be attributed to factors such as herd testing, improved stock breeding, topdressing, higher-quality pastures, and more efficient management. During the period covered by the graph butterfat production per cow has shown a substantial increase, and though in some years recently high yields per cow have been recorded, the largest portion of the increase occurred in pre-war years.



A 6-row drill. The bins which can be seen are those which contain manure; immediately in front of them are six seed bins. The left marker is marking out the position for the return run, while the right marker is raised.

Trials with Sugar Beet Machinery in South Canterbury

By L. W. BLACKMORE, Instructor in Agriculture, Department of Agriculture, Timaru

THE pros and cons of sugar beet production in New Zealand have been discussed on and off over the past 70 years. Until the advent of mechanised farming beet sugar was always at a disadvantage compared with cane sugar (as long as the social implications of indentured labour were ignored) on the basis of unit cost. Fully mechanised crop production has made beet sugar more competitive with cane sugar. Mechanisation has been a major factor in the development of the industry in the U.S.A. Machines have been designed to cope with all phases of crop production from the sowing of the seed to the loading of the crop in the field. New Zealand can produce sugar beet crops of high yield and sugar content, and to test the economics of beet production under full mechanisation the Department of Agriculture in conjunction with the Department of Industries and Commerce in 1946 imported machinery of the latest design from the U.S.A. Apart from any question of establishing a sugar beet industry the trials of the machinery over three seasons during which four areas of 8 to 10 acres each were grown has provided useful information on the mechanical thinning and harvesting of root crops (the lifter has been used very successfully for locally produced chicory) and will be of interest to market gardeners and farmers who produce and lift large areas of root crops.

THERE are many different makes of machines, but only those employed in the trials will be described.

I.H.C. 6-row Beet and Bean Drill

The I.H.C. 6-row beet and bean drill consists of six separate units braced together by cross-bars. Each unit has two sets of bins and coulters. The main set is for the seed and the subsidiary set for the manure. Both coulters are of unusual design. The seed coulter is constructed with two large, flat metal discs on the outer faces of which are depth-regulating bands to ensure even depth of sowing. The manure coulter, on the other hand, is fashioned more after the style of an ordinary drill coulter, except that it is very much narrower. It is designed to sow the manure in a vertical band at approximately 1in. to one side of the seed. The depth of sowing of the manure can also be varied. The placement of manure in this manner is claimed to result in higher crop yields.

Within recent years a great deal of work has been done to improve the distribution of the plants in the row. The sugar beet plant, like the mangold, belongs to the beet family, and in common with members of this group each "seed" really consists of two or three seeds in a cluster. By a process known as segmentation the cluster is split up so that each piece contains only one true seed. The resultant material is then graded for size. The number of "doubles" in the row is thus greatly reduced. Evenness of distribution is further improved by sowing with a special type of seed box which drops single seeds at regular intervals. This is achieved by the use of a perforated rotating plate, each hole allowing one seed to fall through at a time.

Performance

Good seed distribution was obtained with the I.H.C. 6-row beet and bean drill. However, difficulty was experienced in maintaining a regular flow of manure through the manure bins. This was later overcome by fitting stars with thicker, fewer, and more indented teeth. Owing to the need for regular inspection of the manure boxes during sowing, it was felt that a running board attached behind the drill would have been an asset.

Because of the need to travel slower than with the standard type of field drill used in New Zealand, the absence of a running board, and the greater difficulty in filling separate containers, the per-acre capacity is lower than that of the standard drill. The average sowing time was 1 acre per hour.

Dixie Corn and Cotton Chopper

The Dixie corn and cotton chopper is a thinning machine mounted on pneumatic wheels and has two sets of rotary knives enabling two rows to be thinned at a time. It works up and down the rows. The amount of crop cut or blocked out is varied by altering the set of the knives. One man is required to operate the machine, which is steered independently of the tractor by lever control. One very valuable feature is that either or both sets of knives can be lifted clear of the rows. This is known as "skipping the row" and can be practised wherever the crop is too thin for entire mechanical blocking.

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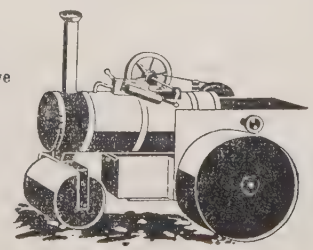

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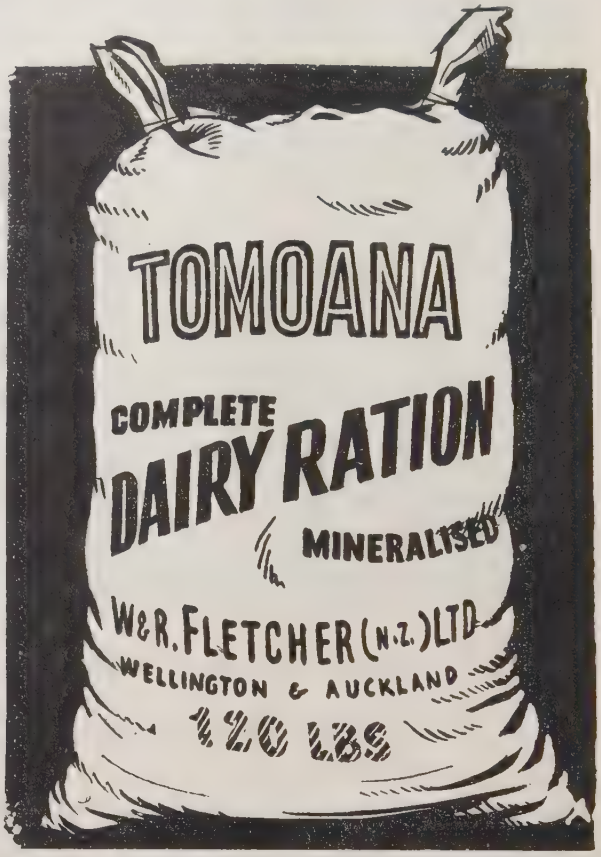

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Performance

To determine the performance of the Dixie corn and cotton chopper 6 acres of the 1947-48 crop was divided into three separate 2-acre blocks and thinned in the following ways:—

Block 1: Hand thinned with the long-handled hoe, which took 88 man-hours.

Block 2: Mechanically blocked followed by thinning with the long-handled hoe (50½ man-hours).

Block 3: Mechanically thinned only (1 man-hour).

No matter what initial method of thinning is employed, hand weeding is essential 10 to 14 days later if weeds are to be effectively controlled. In this trial there were no differences in the times taken for subsequent hand weeding for blocks 1 and 2, but for block 3 (mechanical thinning) the position was very different. In this block the weeds soon began to gain the upper hand at the expense of the crop, and weeding therefore took much longer. Total man-hours for thinning and weeding were 133 (hand thinning 88, hand weeding 45) for block 1; 95½ (mechanical blocking and hand thinning 50½, hand weeding 45) for block 2; and 78 (mechanical thinning 1, hand weeding 77) for block 3.

Although mechanical thinning required the least number of man-hours, it resulted in by far the poorest job. The resultant competition from weeds and doubles in the row resulted in approximately 25 per cent. reduction in yield of crop and much more poorly shaped roots. There were no differences in yields or root quality for blocks 1 and 2. Mechanical blocking can therefore be a valuable aid in reducing thinning time to a minimum. However, for the full exploitation of the mechanical thinner a reasonably thick and even strike is essential. For successful thinning, stands averaging three to six plants per foot are required. A stand can also be too thick, but it is only for the thicker ones with three or more plants per foot that mechanical thinning can be employed without danger of reducing plant numbers below the safety limit for a satisfactory crop. Thinner stands may, with careful hand hoeing only, make first-class crops.

Typical sugar beet plants. The roots are similar in general appearance to those of the parsnip, but are thicker through. The tops often account for as much as 90 per cent. of the total weight of the crop.

I.H.C. 6-row Inter-row Cultivator

The I.H.C. 6-row inter-row cultivator may be mounted on the Farmall H or M model tractors and consists essentially of three cultivator bars, two suspended between the front and rear wheels and the third immediately behind the rear wheels. The cultivating parts, that is the tines, discs, and hoes, are clamped to the bars at spacings to suit row width and the stage of growth of the crop. The bars may be raised or lowered by hydraulic foot control.

Performance

The object of using a 6-row machine for inter-cultivation work was that it follows the exact path of the 6-row drill. Even drilling was found to be of great importance in obtaining effective weed control. The cultivator proved efficient and the hydraulic control for use in turning at the row ends was an advantage. The time taken for inter-cultivating the crop varied with the soil conditions and the stage of maturity of the crop. The first cultivation had to be done slowly to prevent covering and loosening the young plants, and the time taken averaged between ¾ and 1 hour per acre. Subsequent cultivations averaged between ½ and ¾ hour per acre. Three to five cultivations were found to be necessary for effective weed control.

A rear view of the Dixie thinner. There are four adjustable knives on each of the rotors, which turn anti-clockwise. Either rotor may be raised or lowered by lever control.

John Deere No. 54 Beet Lifter

The John Deere No. 54 beet lifter is assembled around a John Deere model B tractor and lifts one row of beet at a time. Mounted in front of the tractor are two large discs, one on either side of the row. These discs trim off the excess side leafage. The cut material is then pushed to the sides out of the path of the topping mechanism by two small graders attached to the discs. The crown of the beet and the leaves are then cut off at about ground level and are collected by a pick-up and deposited to one side of the machine. Next the root itself is lifted from the ground up on to a fast-moving apron by two specially shaped lifting tines. From there it passes on to the tail elevator, which deposits the roots in windrows.

The machine is designed so that four rows of tops can be deposited into a single windrow, and as many as eight rows of topped beet can be deposited into one windrow. The tail elevator, which is pivoted at the rear end of the machine, can be moved through a half circle from one side of the machine to the other. The first row of roots is dropped to one side of the row being lifted. When the second row is being lifted the tail elevator is swung

Left—The lifter at work. The beet is topped and lifted by this machine, the tops and roots being deposited in separate windrows. The tail elevator, over which the topped beet travels, can be swung through a half circle. Right—The finished job. Note the separate windrows of roots and tops. There are eight single rows of roots and four rows of tops in separate windrows.

round so that the roots are deposited on top of the first row. This procedure is continued until eight rows have been lifted and dropped into a single windrow.

Suspended between the front and rear wheels of the tractor is a transverse platform which is constructed so that it can be slid mechanically from side to side. Draped around this platform is a double travelling chain joined laterally with metal scrapers. This chain collects the beet tops thrown up by the pick-up and deposits them either to the left or right side of the tractor as required. The first row of tops is dropped to clear the rear wheel. When the next row is being lifted the platform is moved sideways so that the tops fall on to the windrow already started. This procedure is continued until four rows of tops have been deposited into a single windrow, at which stage the platform is fully extended.

Performance

It was found that where the tops tended to be bulky less trouble was experienced with the topping mechanism if the crop was lightly fed off with sheep just before harvesting. Care, however, had to be taken to ensure that only the top leaves were eaten off, as the lower lateral leaves were required for the efficient working of the pick-up.

For efficient working the beet lifter requires a free soil, while the crop itself must be reasonably free from weed growth, particularly along the row. Stony soils are unsuitable.

The capacity of the machine is from 1 to 2 acres per day of 8 hours.

John Deere No. 120 Loader

The John Deere No. 120 beet loader is comparatively simple in design and consists essentially of an agitator bar at ground level, two separate elevator aprons each about 6ft. long and operating at right angles to each other, and a deflector plate at the end of the top elevating apron for guiding the beet into a truck or other receptacle running beside the loader.

Performance

The machine can load the windrows of beet left by the lifter (eight single rows). with ease. It is a very efficient machine and, depending on the conditions, 5 tons to 10 tons of beet per hour could be loaded.

Loading into a 4-ton lorry. This truck could be filled in from 20 to 30 minutes.

Conclusion

The investigation has thrown light on a number of problems connected with the growing of sugar beet with modern machinery under New Zealand conditions. The more important points are:—

1. Modern machinery can reduce labour requirements per acre to a fraction of what was formerly required. The labour requirements are, however, higher than for wheat and potatoes, the main cash crops grown in New Zealand at present. The labour needed would vary greatly from season to season and would be particularly high in seasons when strikes were poorer than average or where seasonal conditions interfered with thinning and weeding. The demand for seasonal labour would also tend to clash with that for workers for harvesting of other root crops and for haymaking.
2. Experience with the new machinery has given a better understanding of the types of soil on which the crop can be handled with reasonable efficiency.
3. The hourly capacities of the machinery under New Zealand conditions have been assessed.

Preparation of Pigs for Agricultural Shows

AGRICULTURAL and pastoral shows have had a place in farming life in New Zealand for very many years and their popularity is as great as ever. Many farmers exhibit pigs at shows, and in this article points on their preparation for exhibition are described by I. H. Owtram, Extension Officer in Pig Husbandry, Department of Agriculture, Wellington.

THOUGH show competitions, especially in their present form in which performance does not enter into the judging, are of doubtful value as a means of assisting in the selection of good breeding stock, agricultural shows are still the display window of the farming industry and the lure of the prize ticket is as great as ever.

Planning and Preparation

The effective preparation of all animals for shows requires a considerable amount of work and patience and cannot be done properly in a hurry. A quick wash and brush up the day before the show does not put an animal into show condition. Pigs are not more difficult, possibly a good deal easier, to prepare for show than other animals, but they do require what can be called long-term preparation.

Pigs are exhibited in age groups, many for pigs of a very young age, and the first step for the would-be exhibitor is to arrange the farrowing dates of his sows to fit in with the dates of the shows at which he intends to exhibit. For instance, if a pig is to be exhibited in a class for animals over 6 months old but under 12 months old, it is obvious that a pig just over 6 months old is seriously handicapped when competing with a pig nearly 12 months old, owing to the vast difference in size of the animals. Arranging of farrowing dates so that pigs can be exhibited when near the upper age limit for their class is therefore of considerable importance.

Pigs that are to be exhibited must be well grown, and great care should be taken to see that they do not suffer a check. As a high weaning weight is essential, efficient creep feeding should be employed for the suckling litter. The check at weaning that so many pigs suffer must be avoided at all costs. The use before and at weaning of a small quantity of tallow or fish oil is well worth the cost. A small amount (about 1oz. of tallow or 1 teaspoon of fish oil per piglet) is fed in the creep for a week or 10 days before weaning, and at weaning the quantities are increased to 3oz. of tallow or 1 tablespoon of fish oil. The loss of the sow's milk entails a considerable drop of very readily assimilable fat in a litter's ration and it can be replaced very satisfactorily by feeding tallow or fish oil.

Piglets should be left in their farrowing quarters for at least 3 to 4 weeks after the sow has been taken away from them. Castration of boars can well be delayed until they are between 4 and 6 months old, as there is then more time to study them before deciding which shall be retained. However, the greatest care must be taken when castrating pigs 4 to 6 months old and, if possible, veterinary aid should be secured.

Value of Exercise

Pigs after being weaned should get plenty of exercise. They should be let out in good, clean grass paddocks as much as possible. Exercise firms the pigs up, keeps them in good health, and improves their legs and feet, the last being very important. Some training in walking and being driven is desirable and makes the handling of pigs in and out of the judging ring very much easier. A pig that walks well will catch the judge's eye.

At shows in some countries each pig has its own attendant in the judging ring who walks the pig round on the instructions of the judge in the same way that dairy cattle are shown here. Pigs, in consequence, are given much more thorough training in walking and answering to control. This undoubtedly gives the judge a much better chance to look each animal over thoroughly. The adoption of a similar system in New Zealand would be an advantage, though on many showgrounds fairly large judging rings would have to be provided, but in many cases this would be a distinct improvement.

The foundations of a good show team are laid by careful attention to the points already mentioned; no amount of trouble taken later can repair the faults resulting from neglect of them.

Preparation of Individual Animals

The preparation of pigs for exhibition, especially of aged boars and sows, which may require a considerable amount of attention to get their skins and coats in good order, should start at least 2 months before the first show for which they are entered. Younger pigs require less preparation and the preparation can be left until later. The skin of older pigs, especially boars, tends to become scaly and dirt becomes ingrained and is not easy to move with soap and water. If the skin of white pigs becomes scaly, it is particularly difficult to get them in good order.

The following treatment is very effective for dealing with pigs with scaly skin: Give the pig a generous dressing all over of pig oil (refined paraffin) and flowers of sulphur mixed to a creamy consistency. This can be mixed in a tin and put on with a brush. Bed the pig down well, with clean straw if possible, and leave it until the dressing has disappeared, which will take a week to 10 days. Then wash the pig well with lukewarm water and a non-irritant soap; any reliable brand of yellow soap will do. Work up a good lather with a brush, but do not scrub the skin very hard. The pig should stand still and obviously enjoy the treatment. Next rinse the animal well with lukewarm water and remove as much surplus water as possible with the hands. To get the pig thoroughly dry cover it all over with white wood flour, if this can be obtained. This is very fine sawdust from a white, non-resinous wood, such as kahikatea. Leave the wood flour on until it is dry and then thoroughly brush it out, working in the direction in which the hair grows. Dusting with white wood flour is particularly suitable for white pigs.

A prizewinning Berkshire boar.

The treatment should leave the skin clean and free from scale. Sometimes an old boar will be so dirty that even the treatment recommended is not effective. In such a case a mixture of pig oil and powdered charcoal applied in the same way as pig oil and sulphur will usually clean the skin. The mixture is again left on until all signs of blackness have disappeared, and the pig is then well washed.

Oiling Should not be Overdone

Once the skin has been cleaned the pig should be given a light dressing of pig oil and be well brushed. Refined paraffin, which is comparatively cheap and can be purchased from most stores, is the most suitable oil. It is colourless and odourless and puts a good gloss on the hair and a little covers a large area. Neat's-foot oil, which is widely used, is not satisfactory. It is dirty and has an unpleasant, clinging smell, and judges resent getting it on their hands or clothes. It also makes the pig's coat sticky, which nullifies the effect of good brushing. To put a heavy dressing of oil on pigs immediately before they go into the judging ring as some exhibitors do is a mistake. A light dressing the day before judging is sometimes useful if a pig has got very dirty in transit and has to be well washed.

Transport

Care should be taken to see that pigs are transported to shows as comfortably as possible. If pigs are sent in crates, a good plan is to hang sacks of hay or straw to the back of each crate. This will prevent rubbing and chafing, especially with boars.

When pigs are railed two wagon sheets should be used. Pigs are usually placed in J wagons (sheep trucks) and one sheet should be placed over the top of the wagon and the other right down one side to prevent draughts. Boars or sows of different ages should be separated in the truck by hurdles. Only pigs of similar size that are used to being together should be in the same part of the truck and they should be given plenty of room.

The same precautions apply when pigs are moved by road. Care must be taken to see that the pigs are comfortable; too often they are crowded and cramped and they arrive scratched, dirty and bruised, and not infrequently lame. All the work that has been done to prepare them for the show is wasted. A sheet to protect pigs from the weather while they are on the road is well worth while. Loading and unloading must be done carefully, and loading races should be in good order. Show associations should provide good unloading facilities, and if they are inadequate, exhibitors should demand that they be improved.

Final Preparations

Skilful brushing can make a great difference in a pig's appearance. In fact, a good deal can be done to make a pig appear longer by brushing the coat from head to tail, finishing up at the back of the hams. This grooming tends to carry the judge's eye along the line of the pig's coat. The tassel of the pig's tail should be fluffed out attractively, as this improves the animal's appearance.

Though it is undoubtedly true that show-ring judging alone is not a satisfactory method of selecting breeding stock, it does provide an opportunity of studying the points of the live animal. Performance records and a knowledge of the conditions under which the records were made and how to interpret the records, when combined with an inspection of the live animal, form the only really satisfactory method of selecting breeding stock.

If stock are shown, they should look as well as they can be made to look. That is expected of exhibitors by both judges and the public.

Show Dates

THE following are dates and venues of A. and P. shows up to early February.

November 1—Ashburton A. and P. at Ashburton.

*November 2 and 3—Manawatu and West Coast A. and P. at Palmerston North.

*November 7, 8, and 9—Canterbury A. and P. at Christchurch.

*November 9 and 10—Wanganui A. and P. at Wanganui.

November 9 and 10—Whangarei A. and P. at Whangarei.

November 14—North Otago A. and P. at Oamaru.

November 14—Thames Valley A. P. and H. at Te Aroha.

November 16 and 17—Egmont A. and P. at Hawera.

November 16 and 17—Nelson A. and P. at Nelson.

November 17—Bay of Islands P. and I. at Waimate North.

November 17—Taieri Agricultural Society at Outram.

November 17—Courtenay A. and P. at Kirwee.

November 17—Waimate A. and P. at Waimate.

November 17—Waihi A. and P. at Waihi.

November 20 and 21—Otago A. and P. at Dunedin.

***November 22, 23, and 24—Auckland Metropolitan A. and P. (Royal Show) at Auckland.**

November 23 and 24—Stratford A. and P. at Stratford.

November 24—Motueka A. and P. at Motueka.

November 24—South Otago A. and P. at Balclutha.

November 24—West Otago A. and P. at Kelso.

December 1—Helensville A. and P. at Helensville.

December 1—Tokomairiro A. and P. at Milton.

December 1—Winton A. and P. at Winton.

December 4 and 5—Gore A. and P. at Gore.

*December 8—Kaikohe A. P. and H. at Kaikohe.

December 8—Wyndham A. and P. at Wyndham.

*December 11 and 12—Southland A. and P. at Invercargill.

December 15—Otago Peninsula A. and P. at Portobello.

*January 11 and 12—Wairoa County A. and P. at Wairoa.

January 12—Blueskin A. and P. at Waitati.

January 19—Central Hawkes Bay A. and P. at Waipukurau.

January 19—Waikouaiti A. and P. at Waikouaiti.

*January 23—Marton District A. and P. at Marton.

January 25 and 26—Horowhenua A. and P. at Levin.

January 26—Waiau A. and P. at Tuatapere.

January 26—Palmerston and Waihemo County A. and P. at Palmerston.

January 29 and 30—Feilding I. A. and P. at Feilding.

February 2—Clevedon A. and P. at Clevedon.

February 2—Rodney Agricultural Society at Warkworth.

*February 2—Woodville A. and P. at Woodville.

*February 5 and 6—Dannevirke District A. and P. at Dannevirke.

February 8—Dannevirke Ram Fair at Dannevirke.

February 8 and 9—Taranaki Metropolitan A. and P. at New Plymouth.

February 9—Hukerenui A. and P. at Hukerenui.

February 9—Katikati A. and P. at Katikati.

February 9—North Kaipara Agricultural Association at Paparoa.

*February 9—Pahiatua A. and P. at Pahiatua.

* The Department of Agriculture exhibit will be staged at this show.

Budding of Pip and Stone Fruit Trees

By C. E. WOODHEAD, Pip Fruit Specialist, Department of Agriculture, Levin

FRUIT varieties in general do not "come true" from seed and are commonly propagated by grafting. Consequently most fruit trees as raised in a nursery consist of two parts, of which the uppermost is the scion or fruiting variety and the lower the root stock, which supplies the root system.

BUDDING is a form of grafting in which a single bud is taken from the variety it is desired to propagate and inserted into the stem of a root stock. As budding is quick, efficient, and economical of scion wood, it is the most widely used means of raising fruit trees. Many forms of budding have been evolved for a variety of purposes, the method described in this article, known as shield budding, being the most popular.

Root Stocks

Before budding can be undertaken it is first necessary to raise or procure root stocks (commonly referred to as stocks) suitable for the kind of fruit tree to be propagated. Correct choice of root stock is important, as the stock influences the behaviour of the tree throughout its life, especially its size, the age at which cropping begins, and the yield of fruit. Further, a knowledge of the many types of root stock now available enables the nurseryman to select a stock for a particular purpose, whether this is the production of a dwarf, quick-cropping tree for the home garden, or a large, slower-maturing tree for the commercial orchard.

[*Sparrow Industrial Pictures Ltd. photo.*

Fig. 1—Apple bud-sticks.

A detailed discussion of root stocks and their propagation is beyond the scope of this article, but the table on page 281 gives a summary of recommended stocks and methods of propagation. Whether raised from seed, cuttings, or by layering, stocks to be budded should be lined out at 10in. apart in the row, the usual distance between rows being 3ft. During spring and early summer preceding budding the root stocks should be maintained in continuous growth by frequent cultivations.

Budding Season

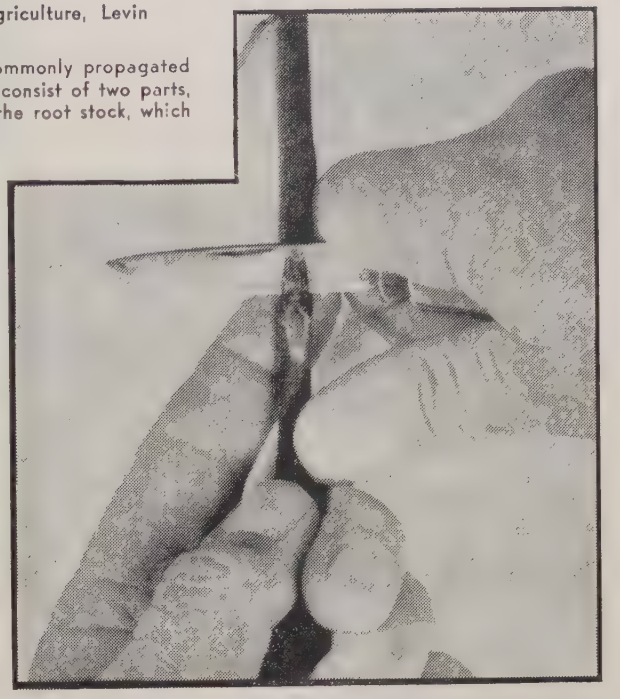
The condition of the stock and the stage of development of the buds on the tree from which budwood is to be taken govern the time at which budding is done. The bark of the stock should lift readily without tearing and it is in this condition when the stocks are in active growth.

As the buds are taken from shoots produced during the summer in which the budding is done, the time of budding is also dependent on the development of well-formed buds on these shoots.

Budding of pip and stone fruits is normally performed at the following seasons: Cherries, December; apricots, January; plums, apples, pears, and quinces, February; peaches and nectarines, from mid-February to the end of March. Peaches and nectarines are budded late, as the stocks, which are raised from seed sown the previous spring, require several months to reach budding size.

Source of Budwood

Careful selection of the parent trees that are to supply the budwood is important. The trees should be free of disease and bearing fruit typical of the variety. Selection of parent trees should preferably be made in the year preceding budding, as this affords a better opportunity to observe tree and fruit characters. The taking of buds from young trees that are not in bearing is not recommended, as it may result in the accidental propagation of the wrong variety.



[*Sparrow Industrial Pictures Ltd. photo.*

Fig. 2—Cutting the bud.

Selecting and Preparing Budwood

In budding, use is made of wood buds formed on shoots of the current season's growth. Wood buds differ from blossom buds in being smaller, less plump, and somewhat pointed. On the peach, nectarine, Japanese plum, and apricot both wood and blossom buds are formed on shoots of the current season and buds may occur singly or in clusters of two or three. Where the identity of a single bud is in doubt, a double or triple bud should be used, as one of these is certain to be a wood bud.

Budwood of the thickness of a lead pencil and carrying well-developed buds should be selected. To prevent shrivelling of the shoots when they have been cut from the tree all leaves should be removed immediately by cutting through the petiole (leaf stalk), leaving about ½in. of this attached to the shoot. The retained portion of the petiole serves as a handle when the bud is later inserted in the stock. In addition to the leaves immature wood at the tip of the shoot should be cut off.

If necessary, the bud-sticks (Fig. 1) as they are now called can be kept in good condition for several days by rolling them in damp sacking or moist sphagnum moss and storing them in a cool building or on the shady side of a hedge.

Budding Tools

A budding knife, secateurs, oilstone, and a quantity of raffia are required to

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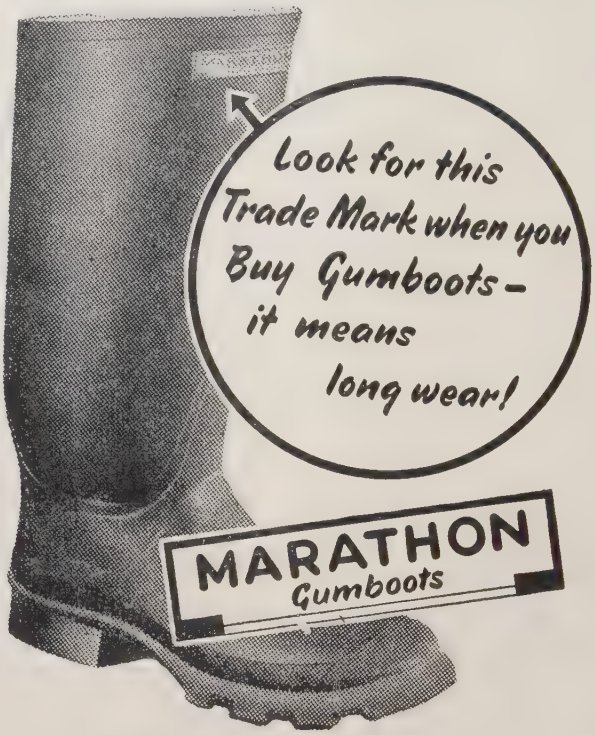

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do budding work. Budding knives are of various types, the type recommended being a light, small-bladed knife with the cutting edge curving upward at the tip. The handle, of bone or metal and bone, is wedge-shaped at its extremity for use in lifting the bark of the stock. Use of a small, light-weight knife tends to develop neat and skilful work, while the curved end of the blade precludes injury to the wood of the stock that a sharply pointed knife may inflict. The blade should be of good-quality steel capable of maintaining a keen edge without frequent use of the oilstone.

For convenience the raffia can be cut into short lengths (about 12in.) and carried in a loop on the belt of the operator. Raffia is more easily manipulated if soaked in water for a few minutes and the excess moisture then thoroughly squeezed out.

Budding

A light wooden tray with a handle will be found convenient for carrying bud-sticks and tools during budding. The bud-sticks will keep in fresh condition if covered with a damp cloth.

Buds should be inserted into the stocks at a height of 3 or 4in. to ensure that the union of scion and stock is well above ground when the trees are planted in the orchard. Trees budded at or near ground level tend to become scion rooted, and when this occurs any special advantages conferred by the root stock are lost.

Budded stocks can be more conveniently inspected and given the necessary subsequent attention if the buds are inserted on the same side of all stocks in the row.

In budding, the lower portion of the stock is first trimmed clean with the secateurs, any shoots and leaves within 6in. of the ground being removed. A vertical incision about 1¼in. long is then made in the stock at the required height, penetrating the bark but not cutting into the wood. The incision is then crossed at the top by a horizontal cut, the two incisions forming a T. As the second cut is completed the knife is given a slight upward twist to raise the edges of the bark at the junction of the two incisions. The stock is then ready to receive the bud.

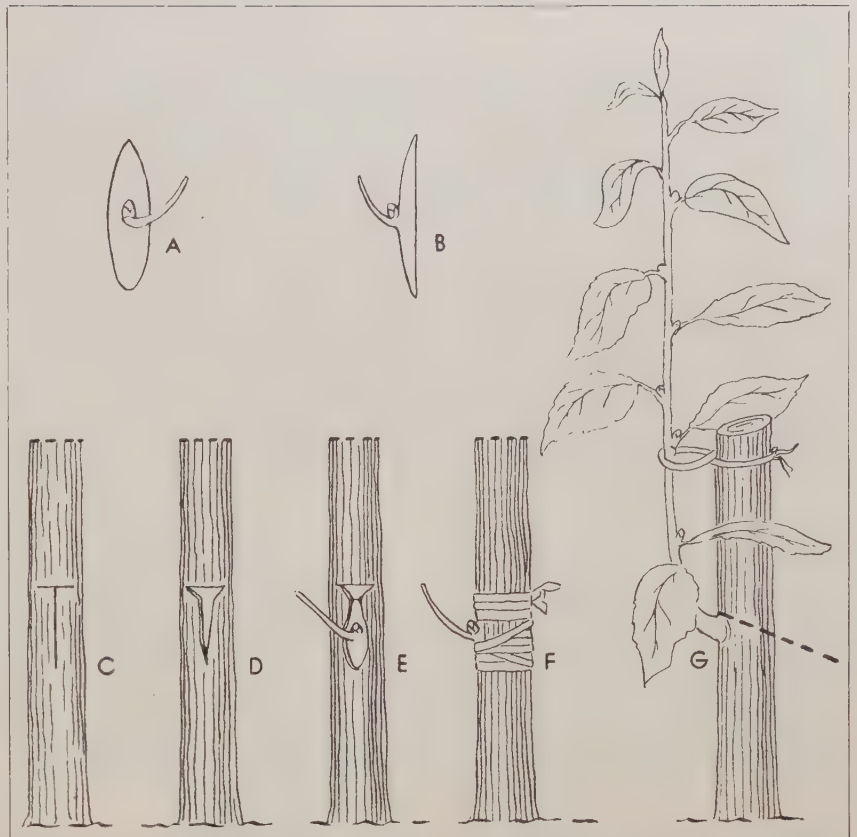


Fig. 3—A, B: Bud prepared for insertion. C: Incision in stock. D: Bark lifted. E: Bud in position. F: Bud tied. G: Shoot from bud tied to snag; snag is removed later at dotted line.

When a bud is being cut (Fig. 2) the bud-stick should be held with the top pointing toward the operator. The bud-stick should be supported with the index finger beneath the bud to be cut, the knife inserted ½in. below the bud, and, with the blade almost flat, drawn under the bud to emerge a similar distance above it. The bud with a thin strip of bark and wood is thus detached from the bud-stick.

The bud, held by the petiole, is then inserted under the bark of the stock at the horizontal cut and forced gently downward until the top of the bud shield is just below the horizontal cut. When in position the bud should lie about midway in the vertical incision with the bark overlapping the bud shield on either side. In practice it is usually necessary to raise the bark with the flattened end of the knife handle to allow the bud to slide down.

The operation is completed by tying the bud with raffia. A common method of tying is to begin at the

ROOT STOCKS FOR PIP AND STONE FRUITS AND METHODS OF PROPAGATION

Scion	Root stock	Recommendation	How propagated
Apple	Northern Spy	Strong-growing varieties on well-drained soils	Stooling*
	Malling No. XII	Less vigorous varieties on clay soils or trees for replanting on all soils	Stooling
	Malling No. XVI	Less vigorous varieties on loam soils	Stooling
	Malling No. IX	Dwarf trees (cordon, pyramid, and bush)	Stooling
Pear	European Pear (*Pyrus communis*)	Commercial orchards	Seed of cultivated varieties, especially Winter Nelis and Williams Bon Chretien
	Angers Quince† (Malling Quince A)	Smaller trees for intensive culture or home garden	Stooling
Quince	Angers Quince	General	Stooling
Peach and nectarine	Peach	Commercial orchards	Seed (stones)
	Brompton plum, Black Damas plum (Malling Type C)	Semi-dwarf trees for the home garden	Layering
European plum	Myrobalan plum (cherry plum)	General	Cuttings
Japanese plum	Myrobalan plum (cherry plum)	Most varieties	Cuttings
	Peach	Vigorous, shy-cropping varieties	Seed (stones)
Apricot	Apricot	Light to medium soils	Seed (stones)
	Myrobalan plum	Heavy soils	Cuttings
Cherry	Mazzard (wild sweet cherry)	General	Seed, root cuttings

* Mound layering.

† Some pear varieties do not thrive when worked directly on quince. For these the quince stock must first be worked with a compatible variety.

bottom and work upward to just above the horizontal cut, the tie being secured by a knot behind the stock. This method is satisfactory except for large buds, which tend to be dislodged. For large buds the tie should be started directly above the bud, continuing downward and thence to the top. Tying should in all cases be done firmly, especially just above and below the bud, and the raffia should cover the incision except at the bud, which must be left exposed.

The whole operation, from the time of making the incision in the stock to the completion of the tie, should be done quickly to prevent drying of the stock and bud.

The stocks will continue to grow after budding and some may be in danger of becoming constricted by the ties. Should this occur within 2 weeks of budding, the ties should be replaced. A successful take is indicated if at the end of 3 weeks the bud is in fresh condition. In addition, if the petiole still adheres to the bud shield, it can be readily detached by a flick of the finger if the bud has taken. If the season is not too advanced, failures can be replaced by inserting a fresh bud in another part of the stock. At 4 weeks all ties should be loosened by running a sharp knife up the raffia at the back of the stock. The buds will usually remain dormant until the following spring.

At the first signs of growth in the stocks in spring they should be cut back to 4in. above the bud. The portion of the stock retained above the bud, termed the snag, later serves as a support to which the bud shoot is tied with twine to prevent wind damage. Alternatively, the stocks may be cut back flush with the bud, but this procedure involves some risk of injury to the bud through dying back of the stock. Whatever the method adopted the cut surface of the stock should be painted with an efficient wound dressing. Bitumen emulsions are very satisfactory for this purpose, but it is essential to ascertain that the material does not contain anything harmful to plant tissues if serious injury to budded stocks is to be avoided.

For several weeks after cutting back, shoots will arise on the stocks and these should be rubbed off as they appear. Failure to remove stock shoots will seriously retard growth of the shoot from the scion bud. Where a snag has been retained when heading the stock the bud shoot should be tied to it for support when it has attained a length of about 6in. The snag should be removed in late summer by cutting it at the point of union with the scion, the cut being made with a slight slope away from the scion. Snagging is done with secateurs or pruning saw, the latter being used on larger stocks. Some skill is required to avoid injury to the scion and also to ensure a neat wound that will heal rapidly. All wounds should be painted immediately with a wound dressing.

Under normal conditions budded pip and stone fruit trees will be large enough to plant the second winter after budding.

MUCH second-class land in New Zealand requires attention to bring it to peak production and great increases can be expected if all the principles of farm husbandry are observed. However, great dangers can arise in the cultivation of the type of land illustrated above. Discs are widely used for such work because they are made in many forms to suit varying requirements, but discs head the list of farm implements which have caused fatalities, 6 operators having been killed in 18 months.

The direction of travel, closeness to obstacles, speed, timing, gear changing, and braking are the responsibility of the driver alone, and lack of attention to any of them can bring about his own death. Greasing moving tandem discs is utter stupidity, yet accidents causing terrible injuries as a result of this practice have been reported.

Faulty judgment is the principal factor in most accidents to operators of machinery. Lack of concentration at a vital moment, even for the shortest of periods, can be fatal.

—J. N. M. WHYTE, Farm Machinery Instructor, Department of Agriculture, Dunedin

Heavy Crop of Pears

THE huge crop of pears illustrated was picked from a Vicar of Winkfield tree in the orchard of Williams Bros. in the Motueka district.

As shown 119 apple cases of pears were picked. Unfortunately, owing to the shipping hold-up, this fruit was not packed. The fruit was clean and well sized and would have packed case for case picked.

The tree, which came from Hales Nursery, Nelson, was planted in 1896 by the late Mr. H. O. Holdaway of Lower Moutere. It is over 30ft. high and has a diameter at the base of 35ft. The root stock is not known.

Williams Bros. have another tree of this variety of similar dimensions. This season it had what appeared to be a light crop, but 77 cases were picked, making a total of 196 cases from the two trees.

—C. E. BUSWELL, Horticultural Inspector, Department of Agriculture, Motueka

Testing of Soil Samples

THE Soil Bureau of the Department of Scientific and Industrial Research has received numerous samples of soil for testing for suitability for use in the making of soil cement for house building. Owing to the Bureau's commitments on works of major importance and the testing of soil for large engineering projects the service of soil testing for soil-cement construction cannot be undertaken.

The knowledge of soils and wartime experience of officers of the Soil Bureau have led them to believe that very suitable soils for soil-cement construction do not exist in the more populous areas in New Zealand and that only in isolated cases is suitable material likely to be found handy to a housing area.

Broodiness in Household Poultry Flocks

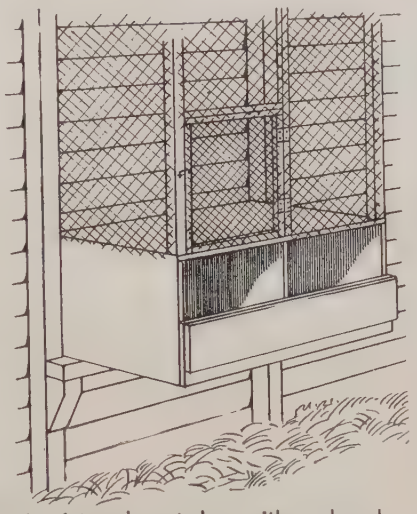
BROODINESS is characteristic of all heavy breeds of hen, though more pronounced in some strains than in others. Light-breed birds do not usually become "clucky", though there are exceptions. The light-breed hen that does become broody cannot be depended on to sit on the eggs until they hatch, but if she does hatch out the chicks, she will usually mother them properly. In this month's article for the household poultry keeper W. L. McIver, Poultry Instructor, Department of Agriculture, Hamilton, explains the symptoms and curing of broodiness.

A poor type of makeshift provision for broody birds.

THOUGH all heavy breeds tend to become broody, careful selection of breeders and rejection every year of all birds that have been broody too often during the laying season can bring about a reduction of broodiness in the strain. At first all birds that are broody more than twice in a year are rejected when hens are selected for the breeding pen. Later the programme can be improved by culling out those that have been broody twice or even once. Broody birds are identified by being leg banded with a ring of a distinctive colour. Some heavy-breed strains have been so reduced in "cluckiness" that the pullets seldom becoming broody during their first laying year.

Light breeds should not become broody. The householder may be prepared to overlook the White Leghorn pullet that becomes slightly broody, but should promptly kill for consumption one that goes deeply broody.

Cross-breeds are liable to broodiness whether the male or the female parent is the heavy bird. The male parent has a pronounced influence on the transmission of the factor for broodiness, so that if a light-breed cockerel is mated to heavy-breed hens, the progeny will have less tendency toward broodiness than if the male had been a heavy-breed bird and the female of a light breed.



An internal nest box with a broody coop on top.

Symptoms of Broodiness

The broody bird clings to the nest placidly and with obvious contentment. She is not readily disturbed and when approached will even guard the eggs by spreading out her wings, uttering warning, clucky sounds, and sometimes showing open resentment. In a deep brood her feathering loosens and her body temperature increases by two or three degrees. Often she will not leave the nest at feeding time. She is not satisfied with her own eggs alone, but will roll under herself any other eggs she can get.

Broodiness is a great handicap to egg production in some strains. A large proportion of birds may frequently be broody at the same time and may remain so for a considerable period. In some strains pullets show little broodiness in winter, but more in spring and summer.

The Broody Coop

Unless fowls are needed for hatching out eggs and to mother young chicks, they should be cured of broodiness as quickly as possible.

When heavy breeds or cross-breeds are kept a daily task of management should be a final visit to the laying house at dusk to remove broody birds from the nest. These and any recognised during the day should be confined in a broody coop, which is a very convenient and almost indispensable piece of equipment. Even if a light breed is kept, such a coop is useful, though it is more likely to be used as an observation coop. For a large flock it can be built outside, but in smaller pens it is better in the house. A broody coop provides the means of checking broodiness in its early stages. As soon as broody birds are found they can be transferred to the coop, so having the coop handy, right over the nests, is a great advantage.

The ideal is a coop large enough to be divided into three sections for broody birds found on three consecutive days. By the fourth day the birds in the first section can be released and that compartment is available again. In small units one compartment can be

A broody coop should be well ventilated, and that can be ensured by making it of wire netting.

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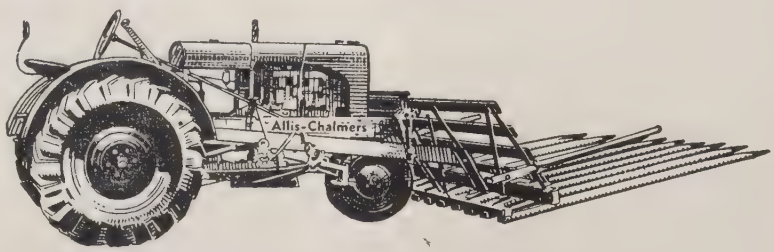

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made to suffice, but it is then necessary to become more adept at recognising signs of broodiness and recovery from it; if a bird is let out too soon, she will be found again on the nest that evening. A method some poultry keepers adopt when they have only one broody pen is to let out all the broody birds for the afternoon grain feed, later putting back all that return to the nests.

Flooring of linoleum or some other smooth material contributes to ease of cleaning in a coop built above the nests; a metal tray which can be pulled out for cleaning is even better. A coop in any other position should be built with a slatted bottom so that the droppings can fall through.

The coop should be airy and well lit. If it is above the nests, the netting front and sides should be continued right up to the roof to prevent other birds perching on top. For an outside coop the back and sides should be of netting, the floor slatted, and the roof watertight. An outside coop in a breezy position is advantageous in hot weather.

Curing Broodiness

Hens seldom become broody unless they have been laying. If they are confined immediately, they will often lay a few eggs in the broody coop. There is no truth in the belief that keeping broody birds in absolute darkness without food and water is the quickest way of curing them. They prefer darkness when broody, and lack of water and food is the surest way of depressing egg yield for an even longer period. Consumption of water and egg-making feed causes the ovary to resume development of yolks and thus helps to keep the fowls in laying condition, with the result that after a few days' confinement they may be released.

Though only 3 or 4 days may be needed to cure birds of broodiness, probably a week or two will pass before they resume laying. On the other hand, if a broody bird is left undisturbed on the nest for days, her broodiness increases and a longer confinement becomes necessary. While on the nest she does not eat sufficient food to stimulate production. Post-mortem examination of a hen which has been broody for a considerable time has shown the big yolks have disappeared from the ovary, leaving only those the size of a large pin-head. These have to go through the usual development before the fowl can come back to the lay. Therefore when a hen has been broody for several days more time is required both to cure the broodiness and to redevelop egg yolks to the point where she will lay again.

A broody hen is so concerned about her eggs that she is not disturbed by being lifted. Often she will not leave the nest at feeding time.

The annual egg yield may not be affected by a bird going into a light brood, even on several occasions. Nature requires the hen to have some rest from egg laying, and only the exceptionally good producer lays for 50, 40, or even 30 days consecutively. Fowls lay in what are called clutches, which vary considerably between fowls and even from time to time with the same bird. Some hens may lay on alternate days; some for 3 days and then miss 1 day; others for 4 days, miss 2, lay for 3 days, and then miss 1.

However, though a short rest may be beneficial, the ovary must be kept active and the maturing—more properly called "ripening"—yolk sacs developing without a complete halt. Once halted in action, the glandular system has to restart the egg-producing routine. This takes time and reduces profits, so broody birds should be kept off the nest and properly fed and watered.

All photographs by Fraser Niederer.

A sure sign of broodiness is shown by a bird that guards its eggs and clings to the nest with outspread wings when approached.

New Poultry Bulletin

A new bulletin on domestic poultry keeping, written by W. L. McIver, who contributes the monthly articles on the subject in the "Journal", has been published recently. It describes the most modern methods which make for efficiency and labour saving. Bulletin No. 336, "Household Poultry Keeping", is obtainable free from the nearest office of the Department of Agriculture.

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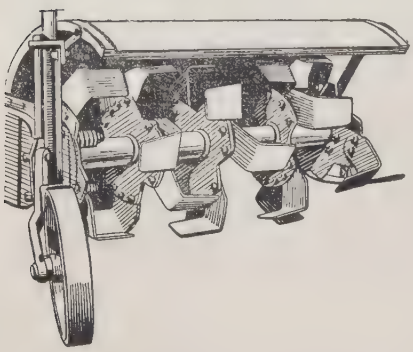

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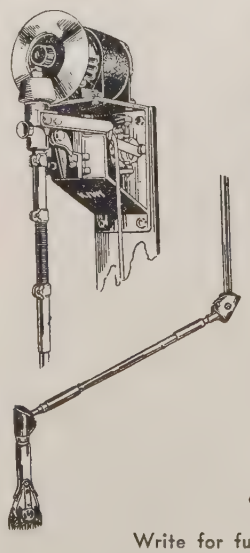

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Irrigation of Glasshouse Tomatoes

FOR many years growers of indoor tomatoes have been experimenting with different types of irrigation systems with the aim of eliminating laborious hand hosing of glasshouse crops. In this article S. O. Gillard, Vegetable Instructor, and C. E. K. Fuller, Orchard Instructor, Department of Agriculture, Auckland, describe a new system of watering practised by an Auckland grower by which plants may be watered both in the field and in glasshouses, though the system is more suitable for glasshouses.

IN irrigating tomato plants the objective is to provide sufficient soil moisture to the required depth without saturating the surface soil. For crops grown under glass, irrigation which gives even distribution of water is essential. Watering of glasshouse tomatoes is considered by most growers to be a very tedious task, and in large glasshouses watering in the normal way constitutes a major labour problem. Any method by which that problem can be minimised without reducing the effectiveness of the watering is worth consideration.

Last season several commercial growers of indoor tomatoes in the Auckland district installed a system to provide their plants with a regulated supply of water at little labour cost and without undue wetting or consolidation of the surface of the soil.

Systems of Watering

In all systems of watering much depends on the volume and pressure available. (The size of the mains and branches will govern this to a large extent.) For the normal system of watering with a hose lengths up to 60ft. are commonly used, and as volume is more important than pressure, hoses have to be of ¾ to 1in. diameter, which makes them heavy and cumbersome to operate.

The grid soaking system, an American innovation, consists of a grid made of a length of water piping along which, at intervals corresponding with the width of the plant rows, are attached short lengths of ½in. diameter piping. To these, soaking tubes are attached by hose clips or cord binding. The soaking tubes are made from 13oz. proofed cotton duck 4in. wide, with a ½in. twice-doubled seam sewn with oiled hemp thread, making a tube ¾in. in diameter. The end of the tube is closed with a similar seam. The soaking tubes may be any length up to 45ft. and the number that can be used at one time depends on the volume and pressure of the water supply.

Operation

The grid, which is attached to the house main by an ordinary hose, is placed on the glasshouse path and the soakers are stretched along the plant rows at the bases of the plants. (It is important for all joints to be watertight and the soakers level and not kinked by lumps of soil or by depressions which would cause uneven distribution of water.) The water is then turned on. The back pressure created in the tubes causes the water to ooze through the cloth. Delivery depends on the volume of water available, but in all cases the tubes must be filled. To ensure an even spread of moisture the soaker tubes should be laid along alternate sides of the plant rows for successive waterings.

A test was conducted by officers of the Horticulture Division to check the output of water at different intervals along the soaker tubes. A 35ft. length of soaker tube was connected to the water service by a ½in. hose and placed along a level strip of ground directly over and clear of three kerosene tins which were sunk into the soil, one tin in the centre of the soaker tube and the other two 12in. in from each end of it.

The test showed that by regulating the pressure a fairly even distribution of water was obtained. If the pressure and volume were too high, more water was delivered at the end of entry of the soaker tube than at the far end.

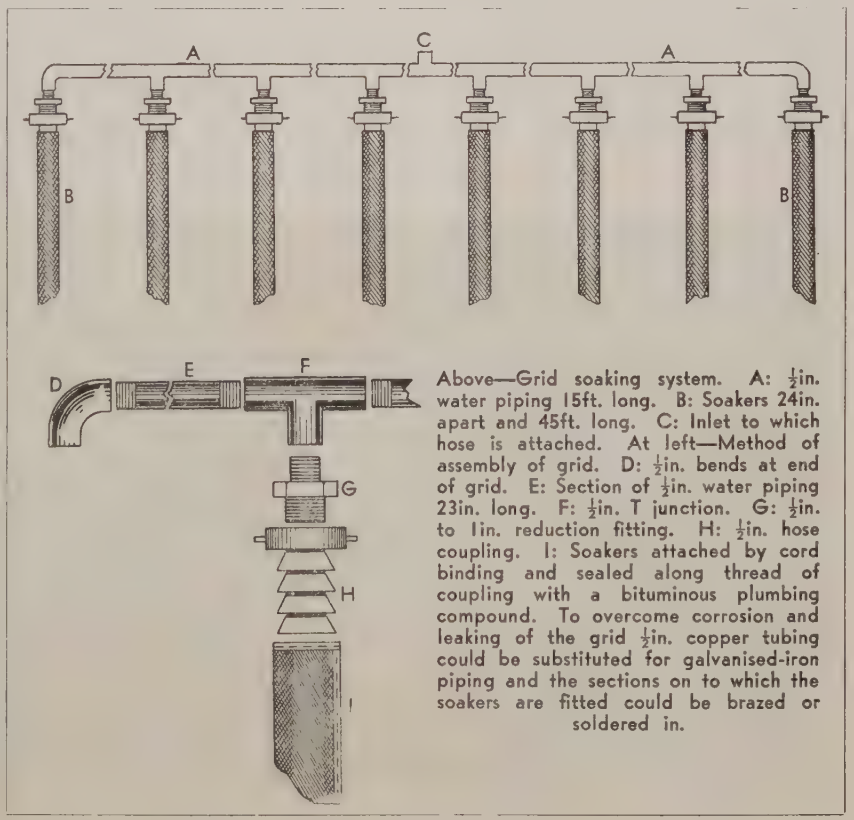
Equipment Used by Auckland Grower

For an outlay of £35 one Auckland grower has provided sufficient apparatus to service in four operations a glasshouse 93ft. long by 32ft. wide. The house is planted lengthways with a 3ft. pathway across the centre of the house. The 1200 tomato plants are set in 16 rows 24in. apart.

The grids servicing the soakers are made of 2 15ft. sections of ½in. galvanised water pipe attached at the centre to a ½in. main by a ½in. rubber hose. The soakers (16 45ft. lengths) are attached one at each end of the grids and the remainder at 24in. intervals along each pipe. The grids are on the edge of the pathway and the soakers are laid out along the plant rows on one side of the pathway.

Because of insufficient volume of water only one grid is operated at a time. This services 8 rows (a quarter of the glasshouse area). After a quarter of the house has been watered the hose from the main is disconnected and transferred to the second grid and the first grid is then reversed and is ready for the third operation. The second grid is operated likewise and is then ready to water the remaining plants. The apparatus is left where it is until required again. Then the operation is repeated, only this time the opposite end of the house is watered first. Had the grower increased the size of the water main, water would have been available in sufficient volume to service the house in two operations, using the 16 soakers at once.

For the installation described water is supplied from a reservoir fed by a bore. At a pressure of 5lb. per square inch water is delivered through the soakers at the rate of 150 gallons per hour or ½ gallon per plant per hour. For a watering at the rate of 1 gallon per plant the servicing of the house takes 8 hours.



Above—Grid soaking system. A: ½in. water piping 15ft. long. B: Soakers 24in. apart and 45ft. long. C: Inlet to which hose is attached. At left—Method of assembly of grid. D: ½in. bends at end of grid. E: Section of ½in. water piping 23in. long. F: ½in. T junction. G: ½in. to 1in. reduction fitting. H: ½in. hose coupling. I: Soakers attached by cord binding and sealed along thread of coupling with a bituminous plumbing compound. To overcome corrosion and leaking of the grid ½in. copper tubing could be substituted for galvanised-iron piping and the sections on to which the soakers are fitted could be brazed or soldered in.

288—IRRIGATION OF TOMATOES

The spread of water in the soil along plant rows at 1ft. depth is about 20in., with little wetting of the topsoil. After using this system of watering for one season the grower states that it has proved very satisfactory in providing the plants with sufficient and evenly distributed moisture and has also been helpful in retaining soil structure and checking fungous diseases, especially leaf mould.

Advantages and Disadvantages

The experience gained so far indicates that watering glasshouse tomatoes by "grid soaking" has the following advantages over the usual system of watering:—

1. Very little labour is required, the work consisting of laying out the lengths of soakers, turning the water supply on, checking the lines, and removing any kinks in the tubes. In a large house, to keep down the cost of installation, it would be necessary to shift the apparatus several times, but other work could proceed during intervals.

2. With experience the operators can regulate the amount of water desired to be given.

3. The water is evenly distributed to the plant roots; this is practically impossible by the hose system.

4. As there is no consolidation of the surface soil, less cultivation is needed to preserve soil tilth.

5. The soil surface and the air in the glasshouse are kept drier. Fungous diseases, particularly leaf mould (*Cladosporium fulvum*) and grey mould (*Botrytis cinerea*) are largely prevented.

Disadvantages are that fertiliser side dressings must be worked into the soil before watering and manure cannot be broadcast and washed in as when watering is done with a hose.

Although this system cannot be fully recommended until it has proved its worth over a longer period, it is so promising that a description of it for the benefit of growers who may wish to give it a trial is thought warranted. No indication of the life of the duck of the soakers can be given at this stage, but probably its life could be extended considerably by treating the soakers with a preservative at the end of each season. Where the water volume is sufficient to service half or all of the house in one operation the soakers can be left in position for the duration of the crop. The material of soakers so used showed no deterioration after a year's continuous service.

Acknowledgment

The assistance given by Mr. D. A. Bingley, of Manurewa, in the preparation of this article is acknowledged.

Rubber Rings in Lambs' Wool Damage Mill Machinery

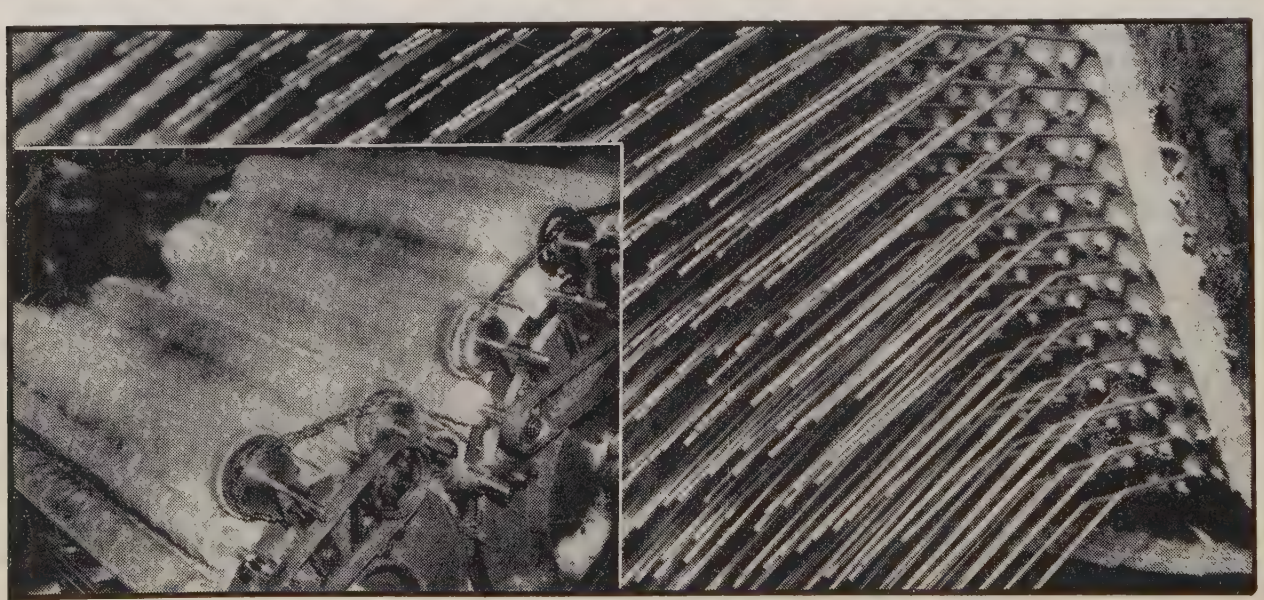
By J. E. Duncan, Wool Supervisor, Department of Agriculture, Wellington

A COMPLAINT has recently been received by the New Zealand Woolbuyers' Association from a British woollen mill that rubber rings in lambs' wool had caused considerable damage to machinery in the mill. This lambs' wool was bought in New Zealand and the manufacturers take such a serious view of the matter that they are unlikely to purchase any more lambs' wool from this country.

THE illustrations below show the front section of a typical carding machine in a woollen mill and a close-up of the fine wires on one of the rollers. The different rollers in the machine run at various speeds and have individual names such as workers, swifts, doffers, and fancies, according to their function, but they all have one thing in common—they are clothed with countless thousands of individual projecting wires. These wires vary in length, thickness, and shape, but most of them are easily damaged by the presence of tough foreign matter in the wool. When they are broken or bent replacement costs are high, but worse still are the faults in the yarn and in the woven cloth caused by this damage, and the heavy loss in production while the machine is under repair—for normally carding machines run for very long periods between overhauls.

The damage caused to these fine wires by a thick and extremely tough rubber ring can well be imagined. Unfortunately because many of the rings used for castrating lambs are white, they are difficult to see among the wool and can easily be missed by the sorter. Admittedly by far the greatest percentage of rings never find their way into the wool at all, but even one getting through to a carding machine could cause a lot of damage. It is proposed to suggest to the makers that if they would colour the rings bright red, blue, or green, these colours would contrast with the wool and make them easier to see and pick out.

Farmers can help the industry by picking over lambs' wool more carefully and removing any rings or any hard dried bits of skin which also cause damage to the machines. Wax matches, jute and twine, hoof clippings, and other small foreign bodies should be rigorously excluded from wool, because the competing synthetic fibres of which so much is heard today, and of which even more will be heard in future, suffer from none of these disabilities.



The damage which can be caused to machinery in woollen mills by the presence of hard substances such as rubber rings in wool can readily be gauged from the illustration of a carding machine and close-up of the wires on one of its rollers.

LOW-VOLUME SPRAYERS: Construction and Operation

LOW-VOLUME spraying with hormone weedicides has made possible a new era in weed control in pastures, crops, and waste spaces in New Zealand. The principle and components of a low-volume sprayer were explained in last month's "Journal" in the first section of this article by C. J. Crosbie, Machinery Instructor, Department of Agriculture, Christchurch. For the benefit of the mechanically minded farmer this section describes not only the operation of the equipment but the building of such a machine—a feat that is well within the ability of the average farmer with a small workshop and who can call on the services of a welder where necessary. A low-volume sprayer is built from units readily available and uses standard pipe fittings and hose with which a farmer who has built his own water-supply system will already be familiar.

AT least four makes of low-volume sprayer can be bought in New Zealand, but a farmer with a mechanical turn of mind may obtain great satisfaction from building his own machine. A simple efficient machine spraying 12ft. to be mounted on a tractor can be built for about £22 as follows (prices at Christchurch in May, 1951):—

	£	s.	d.
¾in. gear pump and sleeve	7	0	0
Filter (built up from pipe fittings)		13	0
Pressure gauge, 0 to 100lb. per square inch, 3in. face	1	5	0
Relief valve, totally enclosed, side outlet	1	10	0
½in. stop-cock		6	0
11ft. of 1in. pipe for boom		14	0
10ft. of ¾in. hose and hose clips	1	2	0
8 low-volume nozzles and 8 ¼in. brass sockets	4	10	0
½in. pipe fittings (estimate)		10	0
44-gallon drum		10	0
Angle iron, bolts, timber, etc. (estimate)		10	0
Welding and drilling (estimate)	3	0	0
	£21	10	0

This machine built by a Blenheim farmer has a front-mounted folding boom. The rest of the equipment is mounted on a trailer mower and the pump is driven from its power take-off shaft.

The construction of such a machine is well within the ability of any man experienced in handling piping and pipe fittings, and home construction offers scope for including any special features not found on commercial machines.

Mounting the Sprayer

When the type of sprayer to be built has been decided the next decision to be taken is what vehicle to mount it on and how to mount it. The choice is wide and will vary with the circumstances. Such a machine is usually mounted on the farm tractor, which can travel at low speeds and has a self-governed engine to maintain a steady speed. However, it may be mounted on a farm trailer drawn behind a tractor (especially useful where water is scarce and must be hauled long distances, for several 44-gallon drums of water can be carried) with a small petrol engine to drive the pump, or it can be mounted on the farm truck. For country so steep or rocky that vehicles cannot traverse it the sprayer may be fitted on a pack saddle on a sturdy horse and the boom carried by two operators. However, as the sprayer is usually mounted on a tractor, that method of construction will be considered in this article.

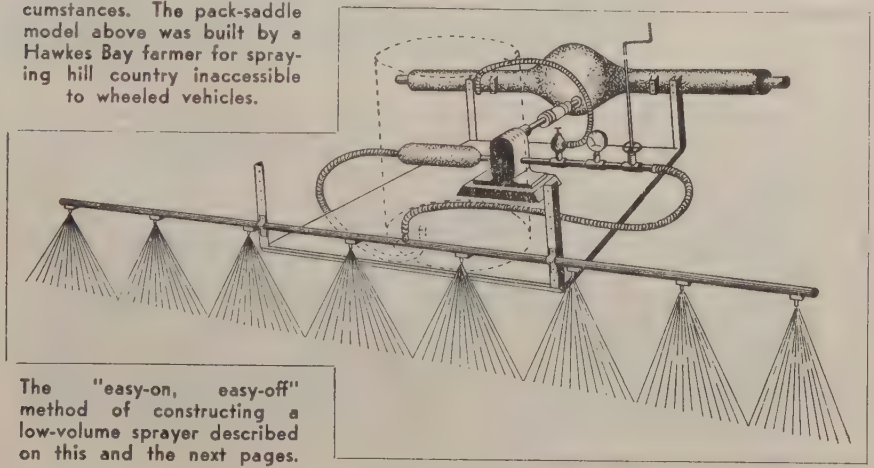
Details of Construction

A sprayer that is easily fitted and quickly removed allows the tractor to be released for other duties. It may be built on the sides and front of the tractor with the pump driven from the belt pulley, leaving the drawbar and power take-off free; shutting off the control valve to the boom and folding the boom in make the tractor ready for other work at a moment's notice. Alternatively, the "easy-on, easy-off" type shown in the diagram on the left, and perhaps the easiest to build, is fitted on with four bolts and one hose clip, so that the whole unit can be released in a few minutes, set on blocks, and put back on the tractor in the same time. The sprayer stays as one unit, so no parts become mislaid or lost and assembly is greatly facilitated. This neat type of sprayer will be considered further, as many of the details are applicable to other types.

The "easy-on, easy-off" type of sprayer is fitted on a platform built over the tractor drawbar and supported by two angle-iron members bent and bolted to the drawbar and to the back axle with four bolts. The gear pump is bolted firmly to a block of wood or an iron strap so that the centre line of the pump shaft lines up with the centre line of the power take-off shaft. The supplier of the pump or the local engineering shop

Special low-volume sprayers may be built to suit the circumstances. The pack-saddle model above was built by a Hawkes Bay farmer for spraying hill country inaccessible to wheeled vehicles.

[*R. W. Orr photo.*



The "easy-on, easy-off" method of constructing a low-volume sprayer described on this and the next pages.

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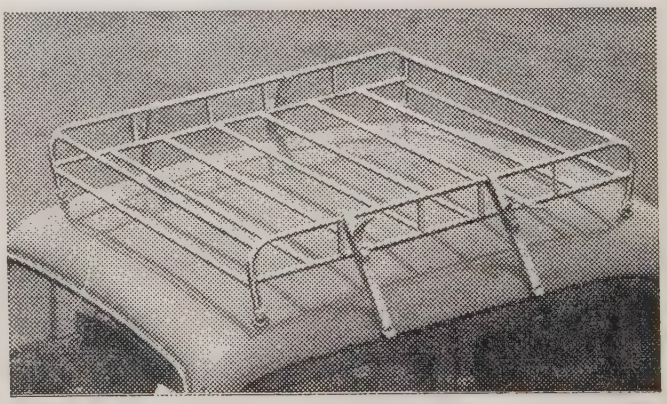

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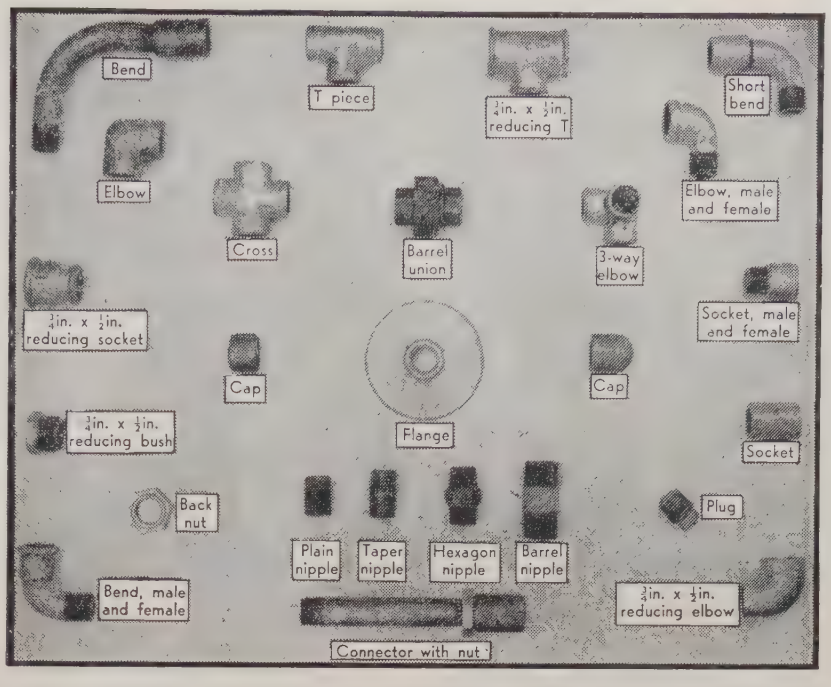
will supply a sleeve (equal in diameter to the power take-off shaft), which is secured to the pump shaft with a grub screw. The union between the pump and the power take-off shaft is made with a 6in. length of ordinary hose, 1¼in. in diameter for a 1⅜in. shaft and 1in. in diameter for a 1⅛in. shaft. Two hose clips secure the hose in place and only one need be undone to release the pump when the sprayer is to be taken off the tractor. The strength of ordinary hose is ample to transmit the ⅓ horsepower required to drive the pump, and should it perish after a few years, it costs only about a shilling to replace. A belt drive using an A-section V belt can be arranged with V-belt pulleys, but is more costly. A chain drive is very expensive and not necessary to transmit the small amount of power required.

The filter can be attached directly to the pump and a suction hose run to the spray tank, which is usually a 44-gallon drum. The suction hose may be dropped down the large bung of the drum or may be fitted to a short length of pipe screwed into a pocket bronzed on to the bottom of the drum, which is preferable, as it facilitates draining the drum after washing down.

Caution is needed when welding old petrol or oil drums because of the very real danger of the torch flame igniting the fumes and causing an explosion. The fumes may be removed by passing live steam through the drum for several hours, or the drum may be filled with carbon dioxide gas by putting battery acid or baking soda in it or emptying a fire extinguisher into it. Alternatively, the drum should be nearly filled with water and arranged so that the air space left is in contact with the open air and adjacent to the part to be welded. Too much caution cannot be exercised, for petrol drums that have held water for months have been known to explode under a welding torch because of the presence of petrol held in the end seams.

The delivery line from the pump is built up as shown in the diagram on the first page, a relief valve being included if the pump has not one built in. The pressure gauge must be placed where it can be seen readily, and if an acid solution is to be used in the sprayer, the gauge must be fitted on top of a short length of pipe so that an air cushion exists between the spray material and the gauge; if the gauge is set directly on a spray line carrying acid, its delicate mechanism is soon destroyed.



[*Green and Hahn Photography Ltd. photo.*

Many of these pipe fittings are suitable for building into a low-volume sprayer, and their names are given to facilitate ordering by telephone or mail. They are all ¼in. fittings unless otherwise specified.

The control valve—a quick-acting valve, a gate valve, or most usually a stop-cock—either has a remote-control lever or is fitted on to the tractor mudguard within easy reach of the operator, hose being used to carry spray material to and from it.

The boom can be fitted in front of the tractor, under it on a row-crop model, or behind it; in whichever place it is mounted, the operator will not be able to see at least two of the nozzles because of the tractor engine or the spray tank. Perhaps behind the tractor is the easiest place in which to fit the boom, for welding a vertical length of light angle iron to each rear corner of the platform allows it to be easily mounted as part of the sprayer and removed with the sprayer as a complete unit.

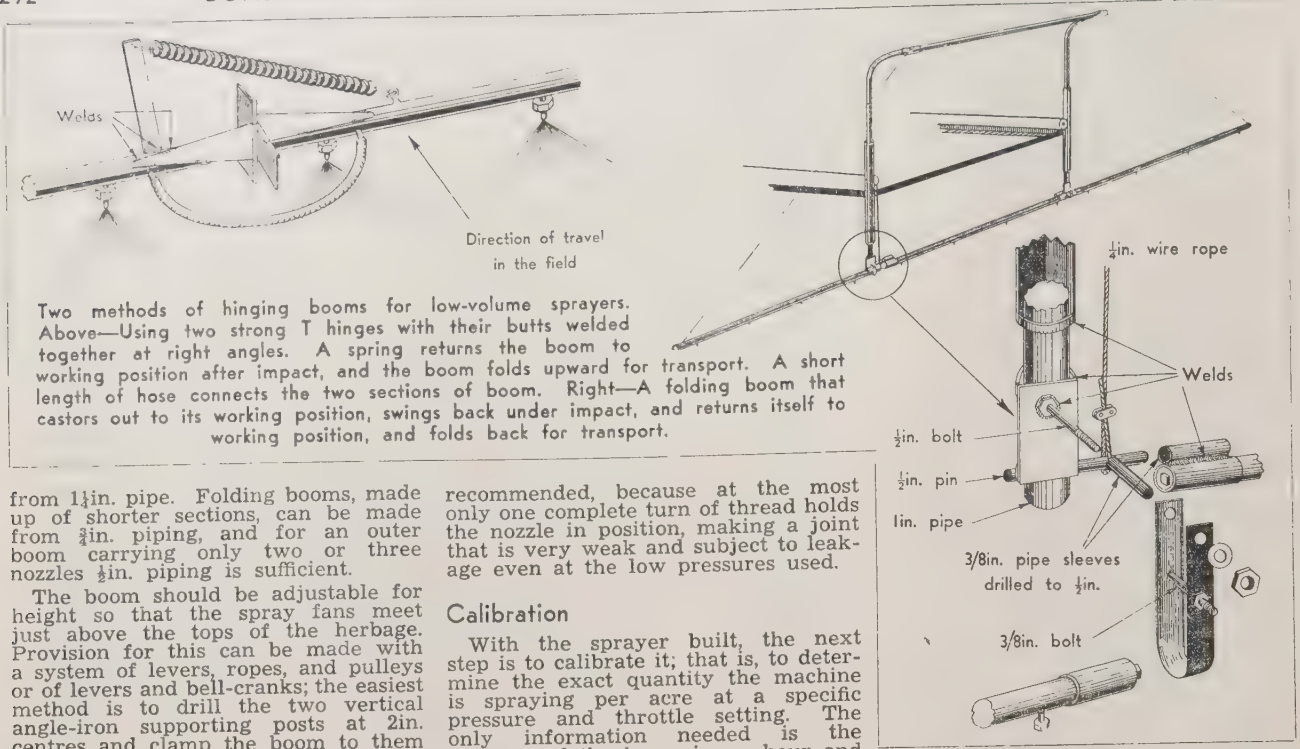
Design of Boom

The length of boom to be fitted will depend on two factors—the width of the gateways on the farm and the area to be sprayed. The usual farm gate is 12ft. wide, and a straight boom spraying 12ft. wide is built up from a length of pipe about 10ft. 10in. long and projects about 2in. past the outer nozzles, so it can pass through the gate with ease. For road travel the boom can be carried along the side of the tractor in special clips arranged for it. Wider booms are usually hinged in three sections to swing back or up for road transport and passing through gates. A folding boom is also a safeguard against damage caused by an impact such as that of striking a fence post when opening up a field.

A boom up to 18 or 20ft. wide with the outer ends stayed to a central post or posts can be supported on the average tractor and worked with ease on cultivated ground. A boom about 30ft. wide needs light castor wheels on the outer ends to keep it parallel with the ground. Shorter booms supported from the tractor are used for spraying rough ground to avoid boom whip caused by the tractor rolling, but an exceptionally short boom causes waste of time except in very special circumstances. Three times round a field with an 8ft. boom has only the same result as twice round with a 12ft. boom. Usually 9 to 10ft. booms are used on cow pastures and 12 to 15ft. booms on cultivated land. An 18ft. boom covers two 15-coulter drill widths, so if the sprayer operator drives up the centre drill-wheel mark, the machine sprays two drill widths without risk of missing or overlapping. The area covered by these wide booms can be calculated easily as detailed in the section on calibration which follows.

Straight booms 10 to 12ft. long need to be made from 1in. galvanised-iron pipe or steam pipe and larger booms

The front-mounted straight boom on this machine is adjustable for height by a lever, chain, and bell-crank.

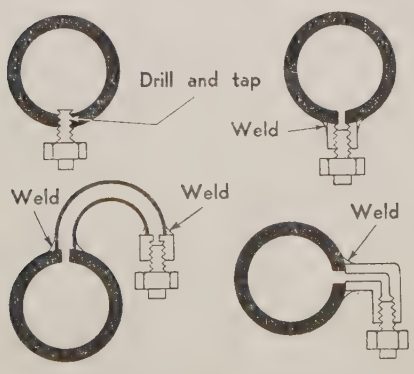


Two methods of hinging booms for low-volume sprayers. Above—Using two strong T hinges with their butts welded together at right angles. A spring returns the boom to working position after impact, and the boom folds upward for transport. A short length of hose connects the two sections of boom. Right—A folding boom that castors out to its working position, swings back under impact, and returns itself to working position, and folds back for transport.

from 1¼in. pipe. Folding booms, made up of shorter sections, can be made from ¾in. piping, and for an outer boom carrying only two or three nozzles ½in. piping is sufficient.

The boom should be adjustable for height so that the spray fans meet just above the tops of the herbage. Provision for this can be made with a system of levers, ropes, and pulleys or of levers and bell-cranks; the easiest method is to drill the two vertical angle-iron supporting posts at 2in. centres and clamp the boom to them with a simple bracket or U bolt. Two types of hinges for folding booms are shown in the diagrams on this page, the spray material in each case being taken past the hinge in a short length of hose.

The nozzles are usually screwed into ¼in. brass sockets bronzed to the underside of the boom, but two other methods, the inverted U tube and the side arm, are also illustrated below. If difficulty is met in bronzing the brass sockets to the boom because of the low melting point of the brass, "Silphos" rod may be used, as it has a very low melting point. Drilling and tapping the boom and screwing the nozzles directly into it is not recommended, because at the most only one complete turn of thread holds the nozzle in position, making a joint that is very weak and subject to leakage even at the low pressures used.



Four types of low-volume nozzle fittings: Upper left—Not recommended because the joint is weak and likely to leak. Upper right—That most generally used, consisting of a ¼in. brass socket bronzed to the boom. Lower left—The inverted U-tube type, which prevents nozzle drip. Lower right—The side-arm fitting, which tends to allow sediment to settle in the bottom of the boom, thus preventing blockage of the nozzle.

Calibration

With the sprayer built, the next step is to calibrate it; that is, to determine the exact quantity the machine is spraying per acre at a specific pressure and throttle setting. The only information needed is the delivery of the boom in an hour and the area covered in an hour, so only two items need be measured—the delivery rate of a nozzle (or better still the average of several) and the speed of the tractor at a particular throttle setting in a particular gear.

Boom output: With the engine turning at a speed equivalent to a tractor speed of 3 to 4 m.p.h. in third gear, and the relief valve set so that liquid is delivered to the boom at 30lb. per square inch (the usual operating pressure of a low-volume sprayer), the delivery rate of a nozzle (or the average of several) is determined by noting the time it takes to fill a vessel of known capacity. For example, with "Monarch" 32 nozzles fitted 18in. apart on a 12ft. boom and operating at a pressure of 30lb. per square inch, a quart measuring jug is filled by each nozzle in an average of 2 minutes 31½ seconds, which represents a rate of 5.94 gallons per hour. Multiplying this by the number of nozzles on the boom (eight) gives 47.5 gallons per hour, which is the output of the boom.

Speed: The tractor is usually operated in third gear at about three-quarter throttle to give a forward speed of between 3 and 4 m.p.h. This speed is checked against the time taken to travel a known distance—say, a 12-chain fenceline or past four power poles on the roadside (usually 3 chains apart). If this distance is covered in 2 minutes 34 seconds, the speed of the tractor is 3.5 m.p.h. The throttle setting which gave this speed is marked so that it can be readily set again and the gear noted; it may be either second or third according to the make and model of tractor.

Area covered: A boom 1ft. wide covers 0.121 acre in travelling 1 mile. Therefore a 12ft. boom on a tractor travelling at 3.5 m.p.h. will cover $0.121 \times 12 \times 3.5 = 5.082$—say, 5 acres per hour.

Spraying rate: The spraying rate per acre is obtained by dividing the boom output in an hour by the area covered in an hour. In the example, 47½ gallons divided by 5 acres equals 9.5 gallons per acre.

Therefore, when this sprayer fitted with "Monarch" 32 nozzles 18in. apart on a 12ft. boom is operated at 30lb. per square inch and 3.5 m.p.h., it sprays 9.5 gallons per hour.

Different batches of the same-sized nozzles may vary a little from their rated capacities, and operators are advised to check the delivery of the nozzles supplied to them by the method described.

Making the Mix

If it is desired to apply weedicide to an area at the rate of 1lb. of 2, 4-D acid equivalent per acre with a sprayer which delivers 9.5 gallons per hour, each 1lb. of 2, 4-D acid equivalent must be mixed with water to make a total mix of 9½ gallons. If the weedicide bought is a 10 per cent. concentration, 1lb. of 2, 4-D acid equivalent will be contained in 1 gallon of concentrate, so 1 gallon of concentrate plus 8½ gallons of water will make enough mix to treat 1 acre. If the concentrate is 40 per cent. 2, 4-D acid equivalent, 1lb. is contained in ¼ gallon, so 1 quart of the concentrate plus 9¼ gallons of water makes the mix. Multiples of these figures make mixes for larger areas.

For good spraying results these calculations must be worked out accurately and the mix made with care. The recommended rate for treating a certain weed includes some margin to ensure that the weed is killed under a wide variety of conditions. The kill is much more sure if this allowance is

Wild turnip (lighter strips) flowering in a field of wheat. Plots treated with ½lb. of 2, 4-D or M.C.P. per acre gave a yield of 89 bushels per acre compared with 53 bushels from the control plots—a return of £18 for about 10s. worth of weedicide per acre.

fully used up in overcoming variations of climate or soil conditions; that is, if the treatment is applied at exactly the recommended rate and nothing is wasted in covering up inaccuracies of application.

When making up the mix in the tank it is a good idea to pour a few gallons of water into the tank first, add the concentrate, and then add the rest of the water. If the concentrate is poured in first, it flows down the outlet pipe to the pump and little mixing occurs when water is added.

Operating the Sprayer

If the pump is set going while the machine is travelling to the field to be sprayed, the spray material can be circulated from the tank, through the pump, past the relief valve, and back to the tank to make a good mix. Slackening off the relief valve, or opening the by-pass valve if the machine has a self-filling device, ensures that the pump is working at no head of pressure while this is going on.

Before the control valve is opened to fill the boom the machine should be manoeuvred so that the boom is against a fenceline. Some spray must be passed through the boom before it is clear of air and all nozzles are spraying evenly, and this material is thus deposited under the fence where it may kill the herbage but will do little harm.

In the field the sprayer may be driven round and round to finish in the centre or it may be worked back and forth to finish at the other side. Perhaps the first is better, because the wheel marks of the tractor in the previous path of the machine show up better and may be used as a guide for the next path.

The use of a marker to make a line on which to drive for the next path is not recommended, for it has been found that the marker must be so heavy to make a mark in pasture or crop that it is difficult to mount on the tractor. Much better is to mount a light rod or pipe on the outer end of the boom and from it drag a short length of light chain which dangles on the nearer wheel mark of the previous path of the sprayer. Missing and overlapping are both avoided, ensuring a good weed kill without damage to the crop through double spraying.

When a field is sprayed round and round, small crescent-shaped areas are left unsprayed in each corner on each round. Whether these corner misses should be cut out after the field is finished is problematical. In the interests of weed control they should be, but they provide control areas that show the degree of weed contamination had the field not been sprayed.

A sprayer used for hormone weedicides that are esters (oil-based concentrates) of 2, 4-D cannot be washed completely free of weedicide before other sprays are used on plants susceptible to 2, 4-D, such as the brassicas and the crucifers. The esters of 2, 4-D are absorbed into either rubber or plastic hose and, though the surface layers can be washed off, more comes to the surface. Tomatoes can be killed with solutions of 2, 4-D of the order of a few parts per million.

However, with care the water-based solutions of the amine and sodium-salt formulations of 2, 4-D and the M.C.P. sodium-salt formulations can be washed out of the sprayer to leave it clean for other work. The machine should be washed well with clean water, rinsed with a warm solution of ammonia or caustic soda, rinsed with clean water, and then filled with clean water and allowed to stand overnight. Another rinsing with clean water in the morning should precede spraying with an insecticide or fungicide.

Some types of sprays can be dangerous to operators

PROLONGED exposure to sprays containing D.N.O.C. or D.N.S.B.P. (both yellow sprays) can cause poisoning. Though little danger exists for a farmer using these materials on one or two days a year, contract sprayer operators exposed to these sprays for longer periods are strongly recommended to take every precaution against contamination caused either by splashes on the skin or by breathing spray-laden air. D.N.O.C. and D.N.S.B.P. are absorbed through the skin, nose, and mouth and build up in the body until a lethal dose accumulates. No antidote to this form of poisoning is known, and after an attack the victim either dies or recovers. Medical science cannot help. Symptoms of poisoning are excessive sweating, thirst, prolonged headaches, loss of appetite, and lassitude. A sprayer operator who suffers from such symptoms is well advised to discontinue the use of these two substances. The hormone-type weedicides 2, 4-D, M.C.P., and 2, 4, 5-T are harmless to man, bird, and beast.

Other Uses of a Sprayer

If a low-volume sprayer can be used for other work outside the spraying season, return from the capital outlay is increased and a means provided of doing work previously done at greater cost in time and labour.

Out-of-season uses of the air-compressor type of sprayer are legion in the implement sheds and workshops of modern mechanised farms and will not be discussed, but the pump type of machine also has its out-of-season uses which are not widely known.

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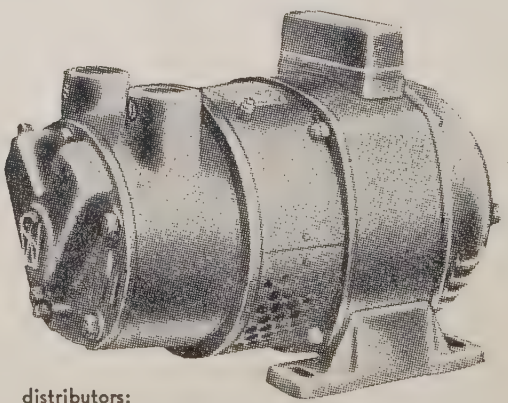

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place of a brush or a knapsack sprayer. The suction hose of the sprayer is dipped into the drum of creosote and a hose from the relief valve returns the overflow to the drum. The unit is set to work at a pressure of 20 to 25lb. per square inch and the spray material is delivered through a length of ¼in. hose to a knapsack-sprayer hand lance fitted with a control valve and a fan-type low-volume nozzle—a "Monarch" 28 or 32 or another of similar size. With the nozzle held about 3in. from a stud the spray will fan out to cover the 4in. face of the stud and, starting from the top, the nozzle is lowered just ahead of the run-off down the stud. Holding the nozzle further away gives a wider spray for treating larger areas such as walls or floors. This method of creosoting is much quicker and more convenient than brushing.

If borer proofing and rot proofing are required in a place where the stain from creosote would be objectionable —say, on the frame of a house that is to be lined with plaster and wall-papered—a 5 per cent. solution of pentachlorphenol can be used. If the concentrate is diluted in lighting kerosene, the spray will not stain plaster or wallpaper. A 40-gallon mix made by adding 4 gallons of 50 per cent. pentachlorphenol to 36 gallons of lighting kerosene costs about £11 and is sufficient to treat the frame and floors of the average-sized bungalow. Protection for the eyes, nose, and throat is desirable when using this mix and essential when working under the floor. The skin, too, needs protection from the "degreasing" property of the kerosene, and lanoline should be applied to the hands at night to prevent eczema.

Fire Fighting

In Canterbury and other areas subject to fire risk in summer keeping the low-volume sprayer pump permanently mounted on the tractor is a wise precaution. A 1¼in. pump mounted on the side of the tractor and driven from the belt pulley to avoid interference with operation of the power take-off, and supplying water through a ¾in. hose fitted with a ¼in. nozzle, will give a solid jet to a height of 15ft. and discharge about 270 gallons per hour at a pressure of only 10lb. per square inch.*

Keeping a few drums of water on a stand at a central point on the farm greatly facilitates loading the trailer and reduces the time taken to reach the fire. Many rural fires can be controlled in the early stages with this small fire-fighting unit.

In the Orchard

An efficient sprayer for disease control on small trees or fruit canes can be built cheaply on the same lines and when fitted with the correct nozzles will make efficient use of modern sprays that are true solutions. Bordeaux sprays that contain free lime are abrasive and would wear out the gear pump, which would need replacement at intervals. Even so, this cheap, efficient sprayer will appeal to a man establishing an orchard with limited capital.

Grass-grub and Porina Control

D.D.T. and B.H.C. (benzene hexachloride) have placed a weapon for the control of grass-grub and *Oxycanus* (porina) in the hands of the farmer. They are usually used as mixtures with superphosphate applied with a drill or topdresser, but either can be applied as a spray. Both wettable D.D.T. and B.H.C. mix readily with water and can be sprayed on with a low-volume sprayer, for the water is only a spreading agent. A shower of rain after spraying provides more water per acre than could be applied with a high-volume sprayer. However, the object in applying D.D.T. is to get it on to the ground, so the sprayer is best used on bare pastures and preferably before a shower of rain to wash residue off the herbage.

Sheep should not graze the pasture after it is sprayed and before rain because they eat the insecticide clinging to the herbage and it is not washed into the ground where it is required. One to 2lb. of D.D.T. or B.H.C. per acre is not poisonous to stock.

Control of Blowfly Strike

Farmers in areas where sheep are subject to blowfly strike would do well to consider spraying the sheep with a mixture of D.D.T. and B.H.C., now available from stockists of sheep dips. The mixture both controls maggots and repels flies, preventing strike and giving protection for up to 6 weeks.

A low-volume sprayer can supply the mixture to a length of hose and a hand boom fitted with a small nozzle that is very suitable for use in the sheepyards The unit shown in the illustration on this page is driven by a small petrol engine and operates at a pressure of 60lb. per square inch. Spray was applied on the shoulders, along the back, on the rump, and into the crutch with the hand lance, and 100 sheep per hour can be treated by one man filling and emptying his own pens.

A low-volume sprayer offers a means of effective weed control, using only small quantities of water per acre, requiring little capital outlay, and saving much time and labour when compared with the high-volume system. It can be easily built by the average farmer from parts readily available and with only a little assistance from the local engineering shop. A farm-built sprayer offers scope for ingenuity in design to suit the circumstances, and whether built or bought the machine has many uses on the farm apart from its main purpose of weed control.

* "Power Farming in Australia and New Zealand", November, 1950, pages 65 and 66.

Selection of a Source of Water for Farm Supply

THE importance of an adequate and trouble-free water supply for farm use cannot be over-emphasised, but existing supplies on many New Zealand farms are far from satisfactory. In this article by C. F. Denmead, Chemist, Dairy Division Laboratory, Department of Agriculture, Wallaceville, the selection of a suitable source of water is discussed.

SAMPLES of farm water from various sources are occasionally sent for chemical analysis to the Dairy Division's laboratories at Wallaceville and Auckland, but usually a farmer takes no action to ascertain the quality of his water supply until some defect has become apparent. An unsatisfactory water supply may be responsible for many troubles, the most common being the corrosion or blocking of iron pipes, the formation of brown stains on utensils and clothes, and the production of hard mineral deposits on water-heating equipment and elsewhere.

In most cases advice can be given about the treatment of water to make it more suitable for important uses on the farm such as washing of milking machines and utensils, domestic use, and stock watering. However, in other cases the water may be unsuitable for any of these purposes, so that the expenditure on boring or digging a well or laying piping from a spring or other source has been wasted. In certain areas wells or springs are known to yield defective waters, but the defects can often be corrected by suitable treatment; in other areas the underground water, and especially water from deep bores, may be of little use.

Creeks, Rivers, and Lakes

Most creek, river, or lake waters are free from the objectionable qualities mentioned, but they are subject to pollution or contamination from such sources as domestic drainage (especially that from septic tanks or pit privies) and drainage from piggeries, cowsheds, and sometimes dairy factories. Another objection to creek and similar waters is that they tend to become muddy in wet weather because of surface run-off, which may include pollution from fields where stock graze.

Despite these objections, use of creek, river, or lake water is preferable to digging or boring unless it is known from local experience that suitable water will be obtained from a well. The cost of digging or boring may be considerable and a usable water may not be obtained, but filters are available to purify stream water. Where a filter is installed provision should be made for storage of water so that the filter need not be used during flood periods when silt would quickly block it.

Surface Water and Rain-water

Therefore the first decision to be made when a new water supply is sought is whether nearby surface water is available in sufficient quantities throughout the year. Failing this, rain-water storage should be considered. The cost of a 10,000-gallon concrete storage tank would be comparable to that of boring a deep well and, if rainfall and roof area are sufficient, a continuous supply of superior-quality water should be ensured.

Both these possibilities should be investigated and a shallow well dug before the expense of boring a deep well is incurred, particularly if deep wells in the vicinity are known to give unsatisfactory water. All available information about the quality and quantity of deep underground supplies should be sought.

Some Bore Waters Unsuitable

The folly of boring for water when an alternative supply is available was shown by the case of a farmer who brought two samples of water to the laboratory for analysis. One sample was from a shallow bore about 20ft. deep which had been in use for 40 years; the water was very corrosive to metals, causing holes in galvanised-iron tanks after about 2 years, and when a pressure system was installed the valves deteriorated very quickly. The other sample was from a new 3in. bore down to 104ft. about 50yds. from the old well and already connected to the pressure system. The samples were similar in some respects, both being acid because of the presence of dissolved carbon dioxide and both having a high salt content, probably caused by seepage from ancient sea-beds, which would accentuate corrosive property due to acidity.

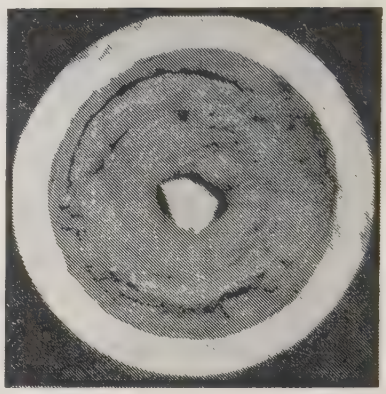
The farmer was advised not to use water from either well without treating it. However, he continued to use untreated water from the new bore, which was so unsatisfactory that when a man with a well-boring outfit was operating in the district he had another bore put down 90ft. nearly 200yds. away. Analysis of a sample from this showed that it contained even more dissolved mineral salts than water from the other deep bore, though it was not quite as acid.

When the farmer brought in the last sample he was asked if there were any springs or creeks in the vicinity. He said water could be obtained from a small creek except in very dry weather, so the possibility was discussed of collecting this into a tank, in which simple treatment could be applied to provide a pure supply.

Thus, without any boring, two sources of water were available, the old shallow well and the creek. Water from either could have been treated simply to provide a good supply, the creek probably being preferable. Instead the farmer spent a great deal of money (perhaps £300 to £400) on the boring of first one well and then another not far away without obtaining a satisfactory water supply. Treatment of the other two available supplies might have cost less than £50.

Competent Advice Needed

The giving of sound advice about a water supply is not simple, for it may involve the opinions of geologist, bacteriologist, chemist, and engineer; other circumstances, including finance, may also play a part. Chemical analysis is a first essential to determine the quality of the water. Bacteriological examination may also be desirable, but usually is more difficult to arrange.



A ¾in. galvanised-iron pipe in which rust has reduced the bore to less than a tenth of the original, impeding the flow of water and increasing the power needed to pump it. This deposit was formed in 3 months by a corrosive, iron-containing water.

A farmer seeking advice about a water supply should approach a local officer of the Department of Agriculture, if possible, a Farm Dairy Instructor, or, if that is not convenient, he should write to the nearest office of the Department. One essential is to give full details about the nature of the supply, including land heights and locations of wells, tanks, and troughs. If sufficient information is available, advice can be given about the treatment needed to improve the water. An expensive pipeline or pumping system should not be installed until a laboratory report about the suitability of the supply has been obtained.

New Home Vegetable Garden Bulletin

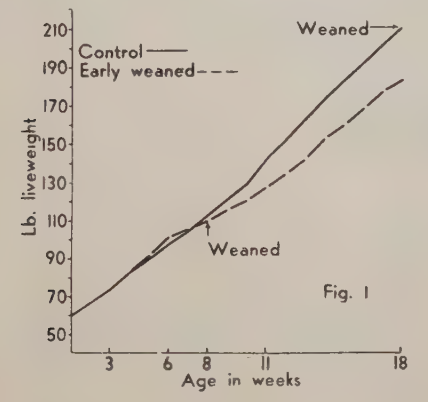
The importance of fresh vegetables in the diet is now widely recognised, but nutritionists also emphasise that rapid deterioration occurs in some vegetables if they are kept for a comparatively short time between harvesting and use. For that reason all families, wherever possible, should attempt to produce at least some of the vegetables they use.

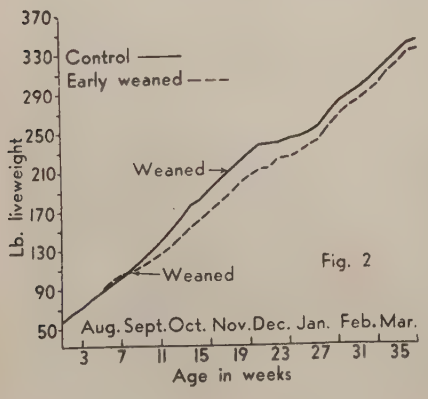
The aim should be to have some vegetables available at all seasons, but to secure a succession is often the most difficult problem for gardeners. Advice on this and other aspects of the growing of vegetables is contained in a most comprehensive bulletin just published by the Department of Agriculture, "The Home Vegetable Garden". Copies are available at 2s. 6d. each, post free, from main offices of the Department or from Whitcombe and Tombs Ltd.

Early Weaning of Calves

DURING recent years many farmers who formerly sent cream to factories have switched to the delivering of whole milk and as a result the cheap by-product, skimmed milk, is not available on their farms for the rearing of calves. Consequently whole milk and other expensive feeds such as dried milk products and meals are being used for calves. Whole-milk suppliers and other farmers have repeatedly requested information on the suitability of various alternative methods of calf rearing. One method which has been pioneered and successfully practised by a few progressive dairy farmers is the weaning of calves at comparatively early ages as a means of saving milk. To provide farmers with data on the subject a series of experiments has been carried out at Ruakura. These were described in a paper delivered by J. C. Percival, Research Officer, Department of Agriculture Animal Research Station, Ruakura, at the Ruakura Farmers' Conference Week from which the following article is adapted.

EIGHTEEN grade Jersey calves born in July and August (about 50 to 60lb. at birth) were fed whole milk up to 3 weeks of age. They were then paired on the basis of their weights at 3 weeks and members of each pair allotted at random to two groups—one the control group, the other the early-weaned group. The whole-milk rations of the control group calves were gradually substituted by skimmed milk during the fourth, fifth, and sixth weeks. Thus from 6 weeks of age they received skimmed milk only until weaned at 18 weeks. The early-weaned group continued to receive increasing amounts of whole milk up to 6 weeks. From 6 to 8 weeks their whole-milk rations were progressively reduced and they were weaned at 8 weeks. All milk rations were fed twice daily, the amounts fed being altered each week according to the weight of each animal. All calves were rotationally grazed as one lot on dairy pasture from approximately 4 weeks of age.





Quantities of Milk Fed

The following table shows the quantities of milk fed under the two systems of rearing:—

Age (weeks)	Pints per Day: Early weaned — Whole milk	Control — Whole milk	Control — Skimmed milk
0–1	6	6	
1–2	7	7	
2–3	8	8	
3–4	9	6	3
4–5	10	5	5
5–6	11	4	7
6–7	8		12
7–8	4		13
8–9	weaned		14
9–10			15
10–14			16
14–16			8
16–18			4
18–			weaned

Growth Rate

Fig. 1 shows the average-growth curves for both groups of calves. At 3 weeks, when treatment differences started, the two groups were comparable in weight. Between 3 and 6 weeks, during which period the early-weaned calves continued to receive whole milk, they grew at an appreciably faster rate than the controls, which were gradually changing over to skimmed milk during the same period. At 6 weeks the control calves had completely changed over to skimmed milk and they continued to grow at a steady rate until weaned at 18 weeks. Also at 6 weeks the whole-milk rations of the early-weaned calves were reduced and a marked reduction occurred in their growth rate from 6 to 8 weeks. Indeed the severity of this check resulted in the controls being heavier than the early weaners at 8 weeks, whereas at 6 weeks the latter group was the heavier. At 8 weeks milk feeding of the early-weaned group ceased, and no weaning check appeared in their growth curve at this point. In fact, from 8 to 11 weeks these calves made a good recovery. From 11 to 18 weeks, although the early-weaned animals were not growing quite as fast as the skimmed milk-fed controls, they were considered to be growing at a satisfactory rate, especially as their growth was being sustained on pasture alone.

At 18 weeks the controls averaged 212lb. liveweight compared with 184lb. for the early weaners, a difference of 28lb., which is equivalent to about 13 per cent. of the weight of the controls. Over the period from 3 to 18 weeks of age the early-weaned calves made 80 per cent. of the weight gains of the control calves, but in skeletal size as indicated by height at withers the early-weaned calves made 90 per cent. of the anatomical development of the controls. Thus weaning at 8 weeks produced calves only slightly smaller in size, although carrying noticeably less condition.

Fig. 2 shows the growth of the two groups up to the end of March. Early-weaned calves grew steadily from 18 weeks of age while control calves lost condition during December and January. At the end of March there was only 9lb. average-weight difference between groups and it is apparent that after a few months early- and late-weaned animals will be indistinguishable.

Although the early-weaned group averaged 109lb. liveweight at 8 weeks of age, individual calves ranged from 90 to 126lb. From this and other data based on weaning at weights below 90lb. it is possible to determine the effects of weaning at different weights. Figs. 3, 4, 5, and 6 show calves at 18 weeks of age and typical results of weaning at different weights.

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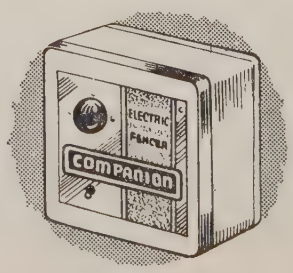

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Fig.	Weight when weaned (lb.)	Percentage under weight (under 212lb.) at 18 weeks
3 ..	.. 60	47
4 ..	.. 80	33
5 ..	.. 100	18
6 ..	.. 120	4

It is apparent that the practice of early weaning can be overdone and these results indicate that 100lb. is the minimum weight at which weaning should be undertaken.

Calves weaned at 8 weeks consumed on the average 60 gallons of whole milk each, compared with the control calves' consumption of 30 gallons of whole milk and 140 gallons of skimmed milk. These quantities represent a 40 per cent. lower energy intake from milk for the early-weaned calves. Valuing whole milk at 1s. 3d. per gallon (equivalent to 2s. 6d. per pound butterfat) and skimmed milk at 2d. a gallon, the cost of the milk used in the rearing of the early-weaned calves was £3 15s. per calf, compared with £3 1s. for control calves.

The weaning at 8 weeks of a calf reared on whole milk cost 14s. more than a calf reared on whole and skimmed milk, but it must be remembered that early weaning is of prime importance to the whole-milk supplier who cannot obtain milk substitutes and who wishes to rear calves.

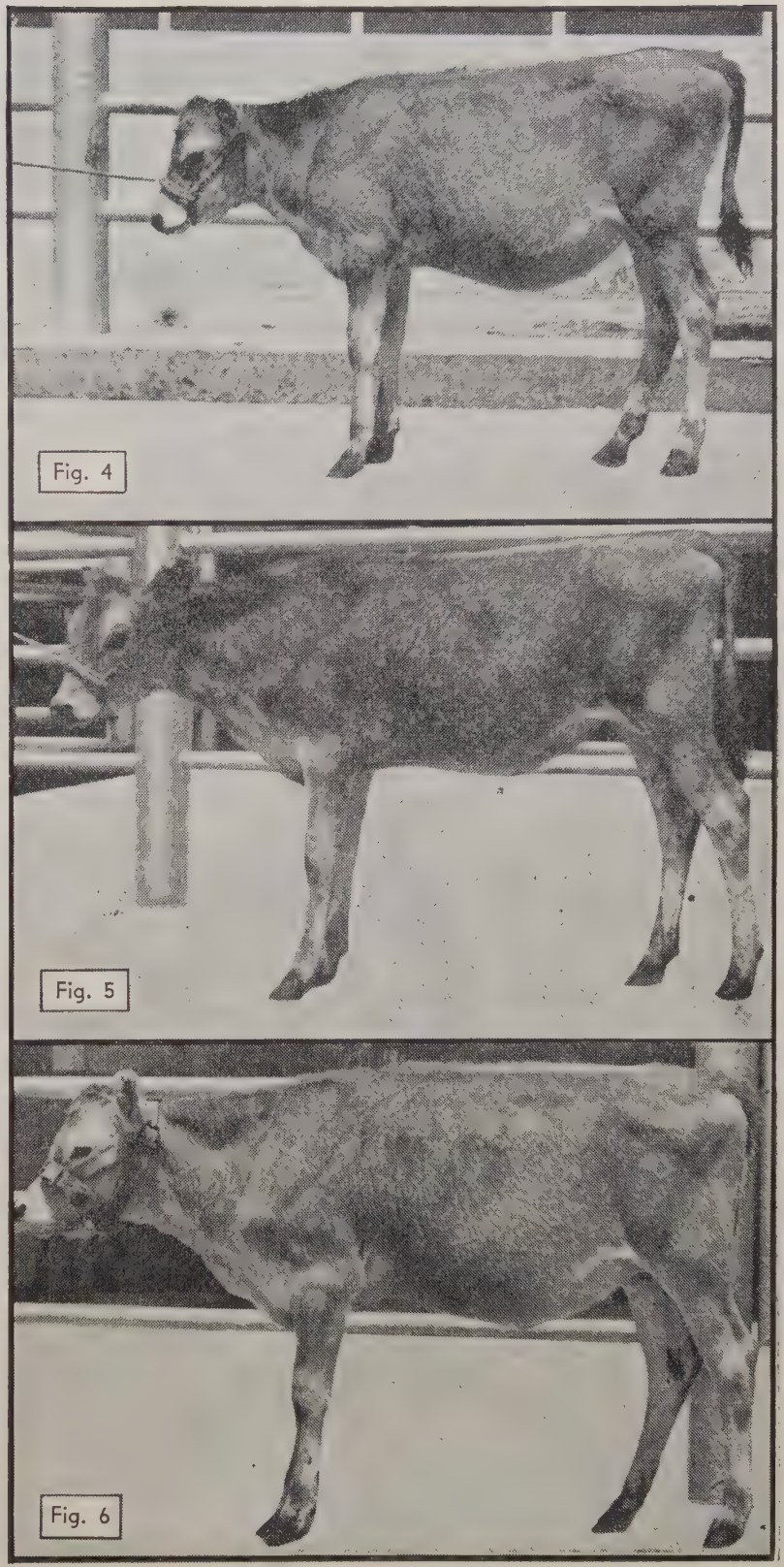
The control calves, which were fed whole milk and then switched to skimmed milk, attained an average weight of 112lb. at 8 weeks, compared with 109lb. for the early-weaned calves, and undoubtedly the control calves could have been satisfactorily weaned at this age. Up to 8 weeks of age the control calves drank 30 gallons of whole milk and 36 gallons of skimmed milk, valued at £2 3s. 6d. per calf. This early weaning of skimmed milk-reared calves would save approximately 100 gallons of skimmed milk per calf, would reduce labour requirements, and would make available more skimmed milk for pig feed.

Recommendations

The recommendations of Ruakura Animal Research Station for early weaning, therefore, are:—

1. Feed 50 to 60 gallons of whole milk per calf for the first 8 weeks only.
2. If a calf is below average size for its age, continue feeding it for an extra 2 weeks, that is, wean it at 10 weeks.
3. If calves are being reared on whole and skimmed milk, wean them at 8 weeks; if any are undersized, wean them at 10 weeks.
4. Practise early weaning only in association with rotational grazing of good-quality dairy pasture.

From analysis of the data derived from these experiments the writer's view is that weight is a very good guide in deciding when to wean calves and probably better than age, since in the experiments some animals large for their age could have been weaned safely at a lighter weight and therefore an earlier age. The data refers only to grade Jersey calves that weigh about 50 to 60lb. at birth. No data on calves of heavier breeds are available, but it is suggested that such data would show that weight is a very good guide to the most successful early-weaning stage.



Figs. 4, 5, and 6 and Fig. 3, on page 297, show calves at 18 weeks of age and typical results of weaning at different weights.

Precautions with Aluminium Roofing Material

ALUMINIUM roofing has been employed widely for farm buildings in recent years, but the precautions necessary when using the material are not well known among laymen. The following article, based on a report prepared by the Dominion Laboratory, gives guidance in the handling of aluminium.

SHEET aluminium alloys vary widely in tensile strength and resistance to corrosion. Most aluminium alloys suffer pitting-type corrosion in weathering, but experience has shown that with some alloys the initial pitting slows down with time, that is the action is self-stifling. Aluminium roofing must be thick enough to survive any initial pitting, and overseas experience has shown that the following alloys and gauges are suitable:—

3S (B.A.60), minimum 22-23 (standard wire gauge).
AW4, minimum 22-23 s.w.g.
AW10, minimum 21-22 s.w.g.
2S, minimum 18-20 s.w.g.

Even thinner gauges of alclad are superior to the above, but are not yet available commercially in New Zealand.

Installation

The most important factor affecting the rate of deterioration of an aluminium roof is the care taken in installation; and the greatest single factor in installation is avoidance of contact between aluminium sheets and any other metals except aluminium or hot-dip galvanised iron. Contact with metals such as lead, copper, etc., will cause perforation of the aluminium; so prone is aluminium to this form of attack that it has been known to fail merely from contact with rain-water which has flowed over copper before reaching the aluminium.

Sheets should be nailed with aluminium (duralumin) nails or, if these are not available, hot-dip galvanised nails. All saddles, brackets, spoutings, rainwater fittings, etc., must be aluminium or hot-dip galvanised iron. Soft aluminium sheet only should be used for flashings. Lead and copper flashings should not be used, because even if they do not touch the roof, rain-water by running over them may be contaminated and cause pitting of the roof.

It is recommended that use of lead-headed nails be avoided, but where their use is unavoidable adequate washers of neoprene rubber or bituminous roofing material should be inserted between the nail heads and the aluminium.

Sheets before being nailed down can be pierced with a drill or sharp steel probe, as this saves the surface from being dented by blunt nails. Drilling is especially helpful at the overlap of 4 sheets. A loose washer of soft aluminium or neoprene rubber under the head of the nail improves weather proofing. (A fabric washer impregnated with zinc chromate can also be used.)

Some engineers consider the slope of an aluminium roof an important factor in removing moisture from the laps and so eliminating undue corrosion. A minimum slope of 3in. per foot is recommended. Ventilation of the space under the aluminium sheeting is also important, and if there is possibility of prolonged wet conditions without free access of air, it is advisable to give the undersides of sheets a coat of zinc chromate primer.

The sheets must not come into contact with wet cement or plaster. These materials should preferably be weathered for about a month and then protected by bituminous paint and a layer of bituminous paper before the aluminium is laid. (Where contact with wet cement cannot be avoided the use of aluminous cements should be considered, as these produce no free lime on setting.) Contact with green or resinous timber should also be prevented by a layer of tar-free bituminous paper. Alternatively, the timber could be given a coat of bituminous or aluminium paint.

Aluminium sheets should never be joined by soldering, as the joint will soon disintegrate in the weather. Jointing is best done by riveting, welding, or flame brazing. Unless a special non-corrosive flux is used all flux residues must be scrubbed off with hot water.

When bending sheets along the line of corrugations try to locate the bend to continue the curvature of a corrugation. Do not scribe the bending line or re-straighten and re-bend the sheet, as such treatment may cause cracking.

Painting

For aesthetic reasons many users will prefer to paint aluminium roofs, and painting, if correctly carried out, protects the metal. However, painting will remove one of the advantages claimed for aluminium, namely, that its brilliant reflection keeps the space beneath it cooler than under a painted galvanised-iron roof. Against this must be balanced the unsightly appearance of the polished aluminium roof and the fact that in a coastal atmosphere the metal will in any case lose its lustre in time.

It is advisable to paint the laps (both contact surfaces) with zinc chromate primer before laying the sheets in place.

To ensure good paint adhesion the metal should be cleaned and etched. This is best done before fixing the sheets in place to avoid trapping chemicals in crevices. Proceed as follows:—

1. Remove obvious grease by swabbing sheets with mineral turpentine.
2. Swab the sheets with a warm solution of ½lb. of washing soda and ½lb. of trisodium phosphate in 10 gallons of water; take care not to get this solution into crevices.
3. Wash sheets well with water, paying particular attention to places where the soda may be trapped.
4. Brush on a solution of 5 per cent. of phosphoric acid in water.
5. Wash sheets well with water.

Other alkaline cleansers could be used in place of 2.

When the metal is thoroughly dry a coat of zinc chromate primer can be applied, followed by a finishing coat of the required colour. Paints containing lead or copper compounds should be avoided.

Repainting should be done while the existing coat is still intact.

Collection of Drinking Water

Water collected from an unpainted aluminium roof is entirely suited for human consumption. If the roof has been painted, it is advisable to wait until it has been well washed by several heavy showers before collecting water for culinary purposes.

Effect of Destructive Agencies

Bird droppings: The Dominion Laboratory has carried out long-term exposures of various aluminium roofing materials at sites exposed to both seagull and pigeon droppings. Apart from causing a slight surface roughening of the metal the droppings have no effect on unpainted aluminium.

Artificial manures: Experiments have shown that there is no risk of aluminium sheeting deteriorating seriously when used to roof sheds where superphosphate or agricultural lime is stored and handled, even when dust can rise and collect in the laps.

Lack of access for air: If aluminium roofing sheets are stacked in wet conditions in such a manner that free access of air to the surface of the sheets is prevented, they may undergo rapid pitting. If aluminium roofing is freely exposed to the air as single sheets, this action does not take place. If lengthy stacking is necessary, sheets are best placed on end and preferably should be oiled.

Thermal regions: The sulphuretted hydrogen present in the atmosphere at Rotorua does not affect aluminium; roofs in that area should last as long as elsewhere.

Effect of timber on aluminium nails: Many green sappy timbers are corrosive to aluminium, especially if these are in contact without free access of air. When using aluminium (duralumin) nails it is wise to employ more than where ordinary lead-headed nails are used, about 25 per cent. more, unless the underlying timber is thoroughly dry.

Contact with rusty galvanised iron: Although contact with new hot-dipped galvanised iron will not cause corrosion of aluminium, contact with rusty iron tends to cause pitting. Aluminium sheets are therefore not recommended for repairing galvanised-iron roofs.

Heat expansion: Soft aluminium sheets have a heat expansion twice that of iron, but under New Zealand conditions the movement produced by expansion will not cause serious tearing.

Earthquakes: A sheet metal roof is less likely to be damaged by earthquakes than is a tiled roof and it offers less risk to occupants than does the latter.

IN THE IMPROVEMENT of surface-sown hill country by oversowing and topdressing, pasture and livestock management may play just as important a part as the sowing of seed and fertilisers. The newly sown areas should never be grazed hard until the clovers are established. Hard grazing is harmful in the first autumn and winter when the clovers are establishing and again in the first summer when they are seeding. A newly sown area is best closed for a few months or lightly grazed with cattle.

SPELL AFTER OVERSOWING

THE VALUE OF SPELLING was well demonstrated in a trial by the Extension Division of the Department of Agriculture at Whakatane, where areas oversown with subterranean clover were subjected to the following treatments: Closed to stock and not topdressed; closed to stock and topdressed with superphosphate; and grazed with sheep and topdressed with superphosphate. When examined in early spring the two enclosed areas contained 2½ times as many plants of subterranean clover on the areas topdressed with superphosphate as on the untopdressed plots, and the growth on the topdressed areas was 3 or 4 times as great. On the sheep-grazed area which was topdressed there were only 500 subterranean clover plants per acre compared with 25,000 plants per acre in the closed area.

—J. E. BELL

* * *

MALVERN COUNTY

A FARM SURVEY was carried out in Malvern County in 1949 and management data were collected from 32 of the 79 farms on light land. Farms using subterranean clover to advantage were found to be carrying almost twice as many breeding ewes per 100 acres as farms which did not exploit this clover. On good subterranean-clover farms an interest surplus of £1.8 per acre was being earned, compared with £0.5 per acre on non-subterranean-clover farms. The average sheep-carrying capacity on the 32 farms was 1 breeding ewe per acre, but well-developed farms were carrying 2 ewes per acre.

The conclusion can be drawn that by the adoption of good dry-land farming methods being pioneered by some farmers, involving the use of subterranean clover, lime, phosphates, and a stand of lucerne, the carrying capacity of these light lands can be doubled, with improved economy in the use of the land and higher revenue for the farmer.

—E. M. OJALA

* * *

NITROGENOUS FERTILISERS

PRODUCTION from many pastures in New Zealand is limited during winter and early spring not only by low temperatures but also by nitrogen starvation. Nitrogenous fertilisers applied to pastures of high annual production during this period usually stimulate growth to a marked degree if climatic conditions are not too severe. If growth conditions are reasonable, stimulation occurs almost immediately. In a recent trial at the Marton Experimental Area, for example, increases in pasture production of up to 44 per cent. occurred in the first fortnight's growth after an early-spring application of 1cwt. per acre of sulphate of ammonia.

SHORT-ROTATION RYEGRASS

BEING an excellent winter and early-spring producer, short-rotation ryegrass gives marked responses to nitrogenous fertilisers applied to stimulate growth at this time. One of the most striking responses resulting from an application of sulphate of ammonia to provide winter and early-spring growth was obtained at the Winton Demonstration Area. The field had been sown in two blocks in December, 1948, to measure the differences between production of short-rotation ryegrass and of perennial ryegrass, each sown at 30lb. per acre and with each area in addition receiving Montgomery red clover at 3lb., white clover at 2lb., and timothy at 5lb. per acre. Though some response was obtained from the perennial ryegrass area, it was small compared with that on the short-rotation ryegrass area, either in sheep days per acre or herbage production.

MIXTURES OF LIME AND AMMONIUM NITRATE

WORK is now in progress comparing sulphate of ammonia, which is the standard nitrogenous fertiliser in New Zealand at present, with new formulations of ammonium nitrate-lime mixtures. Being neutral in reaction, these new fertilisers under certain conditions may give better results than sulphate of ammonia, and it is hoped that they can be used without the danger of suppressing clovers in the sward, an undesirable effect commonly associated with the continued use of sulphate of ammonia.

Though similar mixtures of ammonium nitrate and lime were available more than 20 years ago, they were generally in an unsatisfactory physical condition. The new formulations are granular and free running and in an excellent condition for sowing.

—P. B. LYNCH

* * *

ESTABLISHING PASTURE ON IRRIGATED LAND

UNDER DRY-LAND conditions the drilling of grass or clover seeds mixtures on light land in Canterbury is common. If dry conditions follow sowing, drilling assists in ensuring a reasonable strike. However, if irrigation water is available, a strike is practically assured and therefore drilling the seeds mixture is not necessary. Best pasture establishment under irrigation on Canterbury light land can be obtained by adopting the following practices:—

Border the land about 3 weeks or more before sowing.

Apply 1 to 2 tons of lime per acre on the cultivated land before sowing seed.

Apply 1 to 2cwt. of superphosphate per acre with the seed.

If conditions are very dry at sowing time, pre-irrigate the land.

Irrigate in early stages of pasture establishment if necessary.

Sow in spring or autumn, whichever fits in with the farming programme.

Broadcast the seed mixture.

Make perennial ryegrass and white clover the basis of the mixture.

The vigour of the young pasture will depend very largely on the fertility and mechanical condition of the soil before the seed is sown, whether on irrigated or non-irrigated land. Under irrigation a pasture sown on relatively low-fertility land can be built up into a good pasture by the use of water.

—G. K. McPHERSON

Growing and Storing Pumpkins in the Auckland District

By S. O. GILLARD, Vegetable Instructor, Department of Agriculture, Auckland

THE pumpkin (*Cucurbita maxima*) is a trailing vine which is a native of America and it is known to have been used by the North American Indians before the advent of European settlers. If pumpkins are properly handled and stored, a supply of them can be available all the year. The culture of pumpkins and the best method of keeping them in good condition for a long period after harvest are described in this article.

THE climate of the Auckland district is very suitable for the production of pumpkins and usually 400 acres are grown commercially each year. The average yield from this area is about 4000 tons, or 10 tons per acre, and in exceptionally favourable seasons yields as high as 20 tons to the acre have been recorded.

Pumpkins require a long growing season, but are very frost sensitive. Because of this they can be grown extensively only in the warmer districts which do not usually experience early or late frosts.

The pumpkin is an exceedingly vigorous vine and rich soil conditions are needed to produce heavy crops. It is desirable to select well-drained soils, but those which are likely to dry out in summer should be avoided, as the vine requires a plentiful supply of moisture during the hot months. Rich river flats containing sufficient sand to render them free working usually provide excellent soil conditions. The moisture-holding capacity of the soil may be improved by the addition of animal manure, compost, or green crops.

Varieties

The most popular commercial varieties include Crown, Triamble, Queensland Blue, and Warren. As the pumpkin is readily cross-pollinated, there are many mixed strains, but the best market prices are realised for true types.

Crown is half round to flat, of medium size, and has a grey skin and deep orange flesh; it is an excellent keeper. A particular strain grown in the Whangaparoa district and known locally as Whangaparoa Crown is probably the most popular variety on the Auckland market.

Triamble is a medium-sized pumpkin of distinct shape, having three deeply incised lobes. The smooth skin is light grey and the flesh very thick and of rich orange colour. It is an excellent keeping variety.

Queensland Blue (Beaudesert) is a medium-sized pumpkin with a serrated, dark slate skin. The flesh is thick and orange. Its keeping quality is fair.

Warren, commonly called Red Warren, is a large and very attractive pumpkin with a rich orange-scarlet, heavily warted skin. It is half round to flat with deep orange flesh. This is the earliest variety grown in the district; it does not keep well.

The Crown and Triamble varieties are popular with retailers and consumers because besides being of excellent quality, they do not have thick rinds when fully mature. Being excellent storing varieties they are grown in quantity for this purpose.

Queensland Blue is also a good-quality pumpkin with a thin rind. Although once popular, it is not now grown extensively in Auckland, perhaps because it is not as good a keeper as Crown or Triamble. It is also difficult to procure the true strain of this variety.

The Warren variety is popular with growers because of its early-maturing qualities. It can be marketed early in the year and weeks ahead of other varieties. It has a very hard thick rind when fully mature, but is usually marketed before this stage.

Importance of Good Seed

The first essential in growing pumpkins is to secure good seed of a desirable strain. Many growers prefer to save their own seed by selecting the best fruits and extracting the seed from them. Provided the crop is grown in a fairly isolated area where there is little danger of cross-pollination by other varieties, the strain can be kept reasonably stable for a number of years. A distance of at least half a mile between varieties is necessary to avoid cross-pollination by insects. If other varieties are grown in close proximity, the grower will have to choose between accepting the possibility of his variety being cross-pollinated or procuring seed from a more reliable source.

Seed Saving and Treatment

To extract seed the pumpkin should be cut in halves longitudinally (an ordinary carpenter's saw is ideal for this purpose) and the pulp and the seed scooped out. The seed is separated by hand from the bulk of the pulp and

HEADING PHOTOGRAPH: Before pumpkin plants begin to run cultivation is usually done with a set of discs. In addition to suppressing weed growth this provides suitable tilth.

may be spread out on sacks or shallow trays to dry in the sun. Pumpkin seed should not be washed, as this process removes the thin waterproof transparent skin on the outside of the seed which protects it from excess soil moisture. When seed is thoroughly dry it should be stored safe from rats and mice until required.

The amount of seed required to plant an acre varies from 2 to 4lb., depending on the size of the seeds and the planting distances. It is a good practice to plant plenty of seed and to thin plants out later.

As a protection against soil fungi which may affect the germination or growth of the young plants seed may be treated with copper oxychloride or copper carbonate. The dosage is 1 level teaspoon to 1lb. of seed. The seed and dust should be mixed thoroughly in a tight container until all seeds are coated. Any excess dust should be screened off after the seed has been treated.

Preparation of Land

Pumpkins are often grown after crops such as cabbage, cauliflower, beetroot, parsnips, or carrots to provide a change in crop rotation. Pasture land is also used and in this case early preparation is desirable. Skim ploughing in late autumn or early winter should be followed in spring by a deep ploughing across the previous furrow. Then by the use of discs, harrow, and roller the land can be worked down to a fine tilth.

If time permits, a further deep ploughing followed by cultivation just before sowing will be found to improve yields.

Lime

Although pumpkins are not as sensitive to soil acidity as most vegetable crops, they do best on soils which are only slightly acid, or nearly neutral, that is, pH 6.5 to 6.9. Extremely acid soils should be avoided, and moderately acid soils should be limed at the rate of ½ ton to 1 ton of carbonate of lime per acre, depending on the degree of acidity.

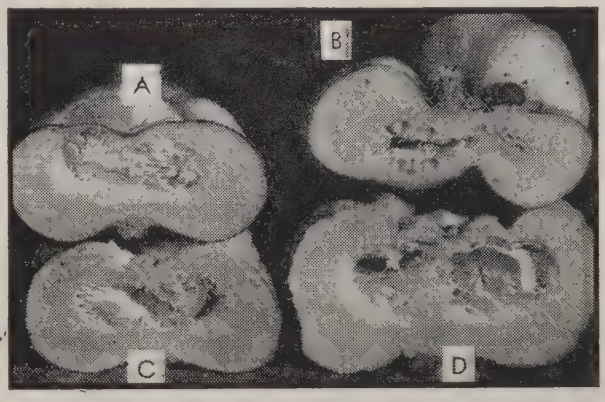
The type of lime to be applied must be determined by conditions. If quick results are desired, the use of burnt shell or hydrated lime may be found advisable, but under most conditions finely ground carbonate of lime will be found satisfactory.

Manuring

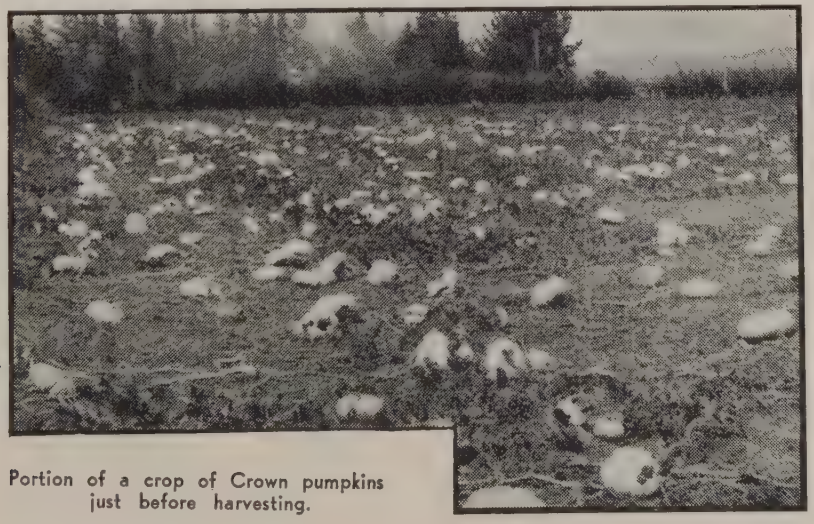
As soon as the risk of damaging frosts is past—usually by mid-October—the crop may be sown. Planting should be delayed, however, until the soil has warmed up and is in good condition to promote the germination of seed. The seed germinates best at a relatively high temperature and is likely to decay if set in a wet, cold soil.

The general practice adopted when using artificial fertilisers is to incorporate in the seed row a fertiliser mixture consisting of equal parts by weight of blood and bone and superphosphate to which is added sulphate of potash at the rate of 1cwt. to each ton of the mixture. The rate of application varies from 10cwt. to 1 ton to the acre, according to the fertility of the soil.

Above—The varieties Crown (A), Triamble (B), Queensland Blue (C), and Warren (D). Below—The same pumpkins halved to show thickness of flesh.



The general practice is to mark the field out into lines 8ft. apart along which the fertiliser is sown in a band approximately 12in. wide. Furrows are then ploughed on either side of the band of fertiliser, thus covering it and forming a ridge approximately 2ft. wide. This ridge is then levelled slightly by running a light inverted harrow along it.



Portion of a crop of Crown pumpkins just before harvesting.

Sowing the Seed

Pumpkin seeds are pushed into the soil point end down to ½in. below the surface; a little deeper may be desirable in very light soils. Planting the seed point end down tends to prevent excess moisture gaining entry and causing the seed to rot. Moreover, the shell of the seed remains longer on the first two leaves and so helps protect them from adverse weather.

Seeds are set in pairs 3in. apart at intervals of 2ft. along the row and seedlings are later thinned to one every 2ft., the weaker being removed.

Side Dressings

It is important to ensure that plants are kept growing vigorously and that they do not receive a check in development. Adequate moisture and good manuring play an important part in promoting rapid growth.

Before the runners are too far advanced in growth, it is usual to

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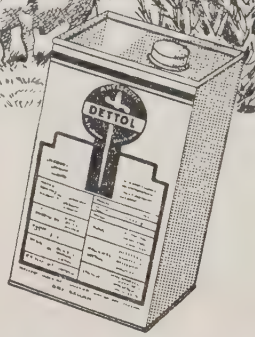

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apply a side dressing, which may consist of equal parts by weight of dried blood, sulphate of ammonia, and superphosphate. This mixture should be sown along each side of the pumpkin rows about 18 to 24in. out from the plants at the rate of from 5cwt. to 10cwt. to the acre and worked lightly into the soil.

Cultivation

To check weed growth and to aerate the soil cultivation around the plants and between the rows should be done from the early stages of growth. It is doubtful if any advantages accrue from more frequent cultivation than is necessary to keep down weed growth.

Provided the soil is easily worked, the removal of weeds by sweeps that cut just under the surface is preferable to using implements that stir the soil to a greater depth.

Runners that have extended more rapidly than others should be stopped by removing the terminal shoot, though this is not generally practised by commercial growers. This temporarily checks the growth of the vine and induces side shoots on which the flowers form.

Harvesting, Curing, and Storing

With the exception of those of the Warren variety, which are harvested when they reach an edible stage, pumpkins for long storage should not be harvested until almost mature. This condition is usually reached when the vines have partly died down. Maturity can be recognised by pressure of the thumb nail on the pumpkin skin. If the pumpkin is fairly mature, the skin will resist ordinary pressure of the thumb nail.

The crop should not be left on the vines too long after the foliage has died down, as is done by some growers, because if heavy rain is experienced, the moisture taken up by the roots of the plant finds its way to the fruit. This excess moisture in the pumpkin may influence its keeping qualities.

Special care should be taken with pumpkins required for long storage to avoid bleeding and bruising of the fruit during harvest. When sufficiently mature, pumpkins should be harvested by severing the vine approximately 4in. each side of the pumpkin stem. They should be placed stem end uppermost and left in the field for about a week to toughen the skin.

Before removing the crop from the field the stems should be cut back to within an inch of the base (a pair of secateurs is ideal for this purpose). If the stems are not suitably trimmed, they may damage other pumpkins or get broken off when being handled.

Only the best-keeping varieties such as Triamble and Crown are suitable for long storage. They should be well matured and carefully handled during harvesting and storing. Cuts and bruises in the rind provide access for decay organisms that may cause a great deal of loss from rots in a short time.

Good results have been obtained by curing pumpkins in a glasshouse or in a sunny situation at a temperature of 80 to 85 degrees F. for 10 days.

Pumpkins stored in single layers on racks in an open shed. (When the photograph was taken the grower had not constructed the roof.)

It is an advantage to spray or dip pumpkins in Bordeaux mixture 3 : 4 : 50 (3lb. of bluestone and 4lb. of hydrated lime in 50 gallons of water) to destroy any spores of fungus which may cause decay. One pound of 50 per cent. D.D.T. wettable powder added to each 100 gallons of the Bordeaux mixture will protect the fruit from possible damage by insects such as slaters and stem borers.

Pumpkins keep best if stored in a dry place where the temperature remains at about 50 to 60 degrees F. The surface of the pumpkin must be kept dry during storage. Temperatures above 60 degrees F. tend to keep the respiration rate too high and shrinkage may result which will impair the quality.

Any dry, airy place where a favourable temperature can be maintained is suitable for the storage of pumpkins and they will keep better if not piled on top of each other. The best method is to provide shelves where they can be placed on their edges in single layers. Storing them in this manner greatly reduces the chances of loss from decay and makes it easy to turn them regularly for inspection and to remove any which show signs of decay.

It is evident from losses experienced by growers that better methods of storing pumpkins should be considered, as the prices realised late in the season more than repay the expense and work involved.

A suitable storage shed which will store in single layers 20 to 25 tons of pumpkins is described. To secure the benefits of lower temperatures the building should be erected on the south of a tall hedge or under tall trees which will eliminate direct sunlight.

Storage Shed

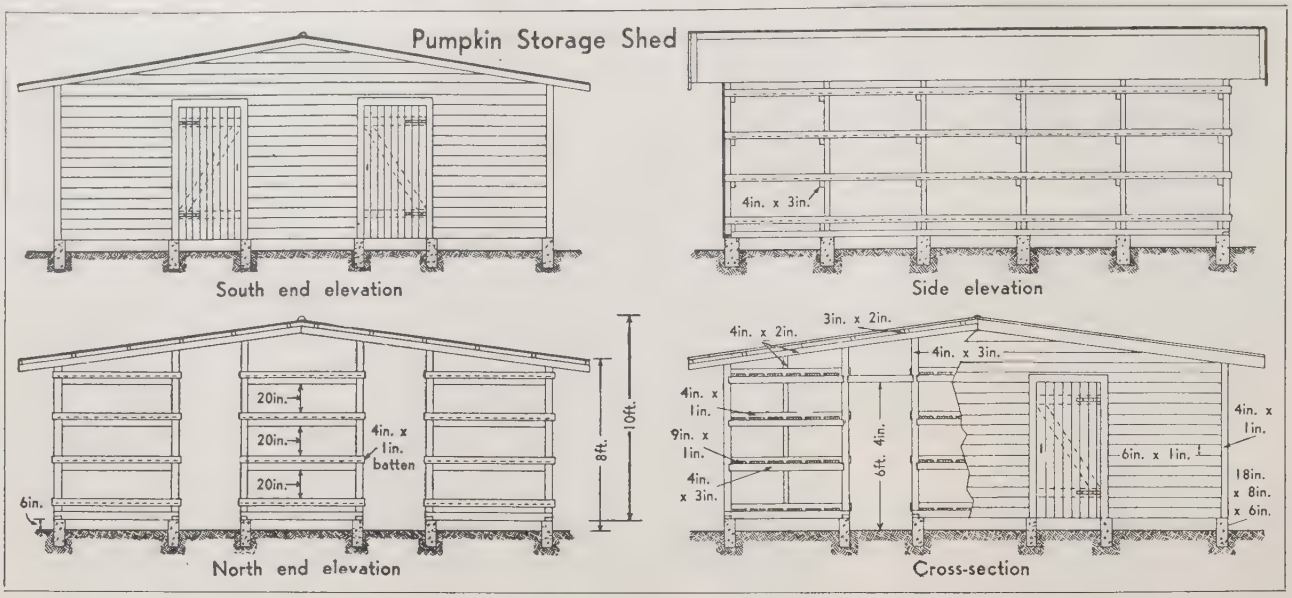
The shed illustrated in this article is 24ft. square and 10ft. 6in. high. It contains 3 tiers of racks with 4 racks in each tier. The racks are 6ft. wide and 24ft. long and are spaced 20in. apart, the first one beginning 1ft. from ground level.

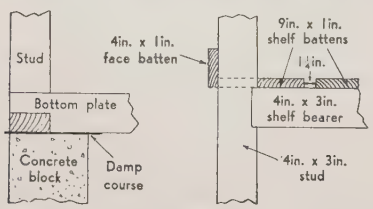
To keep out the cold southerly wind the south wall is fully boarded, but to facilitate aeration the other three sides are open. The alleyways provided between the racks are wide enough to permit the passage of a barrow for bringing in the pumpkins. Doors are provided in the boarded end to enable through working. The shelves are a convenient width and height to allow the operator to work in comfort from each side. The roof is provided with an overhang to keep out rain. This style of shed, besides being useful for the storing of pumpkins, is also ideal for drying onion crops before storing or for drying podded or other vegetable seeds.

The timber used may be *Pinus radiata* (insignis) provided it is treated with creosote, which, besides preserving the wood, is very effective in keeping away insect pests and is also claimed to be offensive to rats and mice.

MATERIALS REQUIRED

	Dimensions (in.)	Total
Concrete blocks ..	18 x 8 x 6	36
		Super. ft.
Timber:		
Bottom plate	4 x 3	170
Studs	4 x 3	318
Shelf bearers	4 x 3	360
Top plate	4 x 2	32
Rafters	4 x 2	112
End bearers to shelves ..	4 x 2	48
Purlins	3 x 2	162
Shelf face battens ..	4 x 1	192
Shelf battens	9 x 1	1512
Cover boards and barge boards	6 x 1	56
Ridge boards and ties ..	6 x 1	40
Facing boards	6 x 1	28
Doors (tongued and grooved and V-jointed)	4 x 1	62
Noggings	4 x 2	10
Roofing iron, 24 sheets 9ft. long, 24 sheets 6ft. long.		
Roof ridging iron, 4 lengths 7ft. 6in. long.		
Door hinges, 2 pairs.		
Door fasteners, 2 tower bolts.		
Creosote, 14 gallons.		





Details of Construction

Concrete blocks are spaced at equal distances and not less than 6in. above ground level. Bottom plates are of 4in. x 3in. timber halved at the corners and placed on top of concrete blocks with a strip of damp-course 9in. x 6in. between timber and concrete. Studs are of 4in. x 3in., spaced at 4ft. 9in. centres. The top plate is of 4in. x 2in. The rafters are of 4in. x 2in. spaced 4ft. 9 3/5in. apart at a pitch of about 1ft. in 6ft. and securely nailed and tied with 6in. x 1in. ties. Purlins are of 3in. x 2in. spaced to suit the iron roof. Shelves, which are 20in. apart, are of 9in. x 1in. boards, spaced 1½in. apart with 4in. x 1in. facings, having an upstand of 3in., nailed on to outside edges. End bearers are checked into the studs on the weatherboarded end of the shed and extra noggings or dwangs of 4in. x 2in. are set in to carry weatherboards as shown in the diagram of the shed in cross-section.

Diseases and Pests

Pumpkin crops are not generally affected greatly by attacks from insect pests and diseases, though some growers may experience trouble. The following are common diseases and insect pests and the control measures.

Powdery mildew (*Erysiphe cichoracearum*) is fairly common on pumpkins, but seldom causes heavy losses. It appears first as small, greyish spots on the leaves, which later become covered with white powder. In severe attacks the whole plant assumes a white, mealy appearance, and eventually withers prematurely.

Treatment: Copper sprays such as Bordeaux mixture 3 : 4 : 50 should be applied at 10-day intervals until the disease is controlled.

Downy mildew (*Peronoplasmopara cubensis*) also attacks pumpkins. It appears as angular, yellowish spots on the leaves, on the lower surface of which a scanty white downy growth develops. This downy growth often cannot be seen with the naked eye. Individual spots are rarely more than ⅛in. in diameter, but may later coalesce and result in the death of the whole leaf.

Treatment: Powdery mildew can be checked by both copper and sulphur fungicides; use Bordeaux mixture 3 : 4 : 50 or lime sulphur 1 : 150 plus 3lb. of colloidal sulphur.

Grey mould (*Botrytis cinerea*) attacks the flowers, and the rot then spreads to the young fruits. This disease is most prevalent in humid weather and where the foliage is dense. If it is prevalent, some of the leaves should be removed to allow sun and air to reach the fruits, and any rotting flowers or fruits should be removed immediately. Apart from this there is no practical control.

Mycospaerella citrullina: This fungus mainly affects pumpkins in storage. In the field it appears first on the stems and leaves of plants; the fruit becomes infected from this source. It appears on the leaves and stems as light brown spots with minute black fruiting bodies. The fruit rot begins as water-soaked or greyish areas on the rind; these gradually become dark brown to black. Only a small portion of the rind may be affected or in severe cases a large portion of the pumpkin may be covered. The flesh remains firm, but is usually attacked by secondary soft-rotting organisms. Large numbers of small, black fruiting bodies are present on the affected areas. Where the disease is troublesome the crop should be sprayed, particularly when the fruits are nearing maturity, with Bordeaux mixture 3 : 4 : 50.

Root rot or canker (*Bacterium carotovorum*) is sometimes troublesome, especially in areas where pumpkins have been grown for a number of years. It causes a soft brown rot at the base of the stem just above or below soil level and usually results in the death of the plant.

There is no practical control. Crop rotation should reduce the trouble to a minimum.

Cucumber mosaic: This virus disease does not affect pumpkin crops in Auckland to the same extent as in other parts of New Zealand, where it sometimes causes serious losses. Symptoms consist of stunting of the plant and mosaic mottling of the foliage and sometimes a mottling and distortion of the fruits occur. Seed should be saved from disease-free plants. Healthy plants should not be touched after handling diseased ones, as the disease may thus be spread. The hands should be thoroughly washed after handling diseased plants. Rogue and destroy affected plants.

Aphides: The young leaves of pumpkins sometimes curl from the attacks of dense colonies of soft-bodied plant lice or aphides. These can be controlled by spraying the plants with 1 part of nicotine sulphate in 600 parts of water. To increase the effectiveness of the nicotine sulphate soft soap should be added at the rate of 3lb. per 100 gallons of spray. The soft soap should first be dissolved in 3 or 4 gallons of warm water and the nicotine sulphate added to the concentrate, which should stand for 15 minutes before the required quantity of water is added.

Springtails (collembola) are minute, wingless, yellow, brown, or black globular insects about the size of a pin-head. When disturbed they spring rapidly into the air. The insects sometimes cause considerable damage to young pumpkin plants by chewing tiny holes in the leaves.

Treatment: Spray the plants with 50 per cent. D.D.T. wettable powder at a strength of 1lb. in 100 gallons of water. To make the spray stick to the foliage it is an advantage if 4oz. of casein powder is added.

Acknowledgment

Acknowledgment is made to the Plant Diseases Division of the Department of Scientific and Industrial Research for assistance in the preparation of the section dealing with diseases and their control.

All photographs in this article are by Sparrow Industrial Pictures Ltd.

WEED CONTROL IN THE FLOWER GARDEN

EARLY summer brings the return of the major seasonal growth of weeds, and the gardener is faced with the problem of controlling it. Some gardeners find weeding an onerous task, but for those who understand the principles of weed control that is not always so. In this month's article for the flower gardener C. K. Ellis, Horticulturist, Department of Agriculture, Dunedin, discusses the weed problem and methods of overcoming it.

THE gardener who waits until beds and borders are filled with weeds before endeavouring to eradicate them is setting himself an uphill task, for season by season weeds will become more and more numerous and his chances of eradicating them less and less. Control can be achieved only by eradicating weeds while they are small and unable to produce seeds or to reroot after being disturbed.

Weed Seeds in the Soil

Most weeds reproduce themselves from seeds or some perennating organ which is left in the soil. All fertile soils contain some weed seeds, but soils which have been neglected, even for a few years, may have many thousands per square foot. Cultivation distributes these seeds throughout the depth of the soil, and most of them are so small that they normally escape detection by the eye.

Weed seeds remain viable for a number of years in the soil, but germinate only when they are lifted to a suitable position in the surface layers. This is amply demonstrated when fertile soils are ploughed after having been in pasture for a number of years, the weed growth being normally plentiful and vigorous.

Regrowth from Underground Parts

Old pieces of root stock, bulbs, or other underground organs left in the soil by previous generations of weeds which have not been eradicated completely create perhaps the worst nuisance. This situation is brought about by the weeds either dying down naturally or having only their above-ground parts removed during cultivation. Weeds such as oxalis are the worst offenders, but quite a number of other species with such underground organs are short lived if all above-ground parts are removed regularly, depriving them of light and food.

Other sources of weeds are nursery stock and soil from outside sources. Weeds such as bindweed, couch and twitch grasses, and oxalis are readily distributed in this way. Nurserymen can help to a large extent by ensuring that the roots of their plants are clean, but, apart from steam sterilisation, little can be done about soil which is brought in.

The number of weed seeds distributed by birds is negligible compared with the number wind borne.

[*Sparrow Industrial Pictures Ltd. photo.*

Frequent cultivation does much to prevent weed growth and cracking of the soil.

Prevention of Seeding

Cultivation distributes through the soil a tremendous number of seeds, some of which may germinate each year for many seasons, fresh ones being brought to the surface each time the garden is cultivated. Therefore, if weeds are permitted to seed freely for only one season, many years may be needed to eradicate all the resultant weeds. Weeds such as shepherd's purse and dandelions may produce up to 10,000 seeds each when they are well grown. The importance of removing weeds before they seed should therefore be clear.

Removal should not consist of merely pulling or cutting the weed and leaving it on the surface of the soil, because many weeds can ripen their seeds even if the plants bearing them are pulled from the soil while still in flower. Even throwing them on a rubbish heap does not reduce the hazard, and they should be added to a compost heap only when the heap is properly constructed and generating its heat efficiently.

Further, the longer weeds are left to grow in the flower garden, the longer are they in competition with the garden plants for food and moisture. Their value as a green crop for digging in or for composting is far outweighed by the amount of valuable materials they remove from the soil.

Hoeing Young Weeds

Undoubtedly, the only satisfactory time to destroy weeds is when they are young. Apart from any other consideration, that is much easier than trying to disentangle old weeds which have grown among border plants.

A little exercise in observation will enable the gardener to distinguish between seedlings of weeds and those of border plants, and it is little trouble to run a hoe or other cultivator through the border when the weather is dry, cutting the young weeds just below the soil surface. Normally, seedling weeds treated thus will die, because the tops are soft and young and cannot reroot, and the taproots of seedlings usually do not shoot again. Seedlings that are merely pulled from the soil and dropped on top of it with roots still intact have a fair chance of taking root again if rain falls soon afterward.

Another advantage of frequent hoeing is that the soil surface is kept in a state of good tilth which encourages the germination of weed seeds during damp weather. At the next hoeing such seedlings are destroyed and the weed population is slowly but surely reduced.

Weeds that by some chance have been allowed to develop to flowering stage should be pulled by hand, care being taken that the roots are removed as well as the tops. Roots of well-developed weeds of the type such as chickweed reproduce themselves with greater vigour after the tops have been pulled. Tops of such weeds and those with flowers or seed heads should be burnt to avoid the risk of seed ripening and becoming established in the compost heap.

Killing Underground Growth

Bindweeds, couch grasses, oxalis, and similar weeds with perennating organs or underground stems which live from season to season and produce new shoots from below the surface of the soil present a much more difficult problem. The principle in the eradication of this type of weed must be never to allow new growths to develop above the ground.

Foods stored in the underground parts enable these weeds to form a section of new shoots, but the production of each does not impose a great drain on the food resources. With the production of even an inch of green foliage above the ground new food is manufactured and passed back to the underground parts for storage, thus increasing the chances of that weed growing in the following season. If the shoot is cut off almost immediately after its appearance above the soil, the root stock is weakened by the production of a shoot which does not return any food to it, and if these shoots are cut off regularly, the underground parts will gradually be weakened until they die.

Such perennating weeds can be eradicated, but only by consistent and immediate removal of shoots from

above the soil and by the picking out and burning of all underground parts each time the soil is cultivated.

Many types of chemical weedkillers are now available, but few of them are capable of general application to weed control in the home garden. They are mostly selective in nature and can be applied with safety only on a field scale and to field crops. They are occasionally useful for eradicating weeds such as convolvulus from shrub gardens, where their selectiveness prevents damage to the shrubs.

Flower Garden Work for November

Annuals can still be sown if the soil is not too dry, but late sowings often give uneven germination and poor growth. For late flowering, orange and yellow calendulas should be sown in boxes and the seedlings pricked out into other boxes as soon as they can be handled. They may be planted out to the borders early in the new year. Though calendulas are moderately resistant to drought conditions, they should be thoroughly watered when they are planted.

Bedding plants, such as nemesias, petunias, marigolds, salvias, asters, stocks, and viscarias, can still be planted out in November. If the soil is dry, it should be watered thoroughly the day before the plants are set out, and it is then unwise to firm the soil too much in case it should set hard.

Bulb foliage should not be cut off until it has turned completely brown; in this state it is quite useful for the compost heap. Tulips and daffodils in early districts may be dug up and put in an airy shed to dry off. Tulip bulbs should never be left in sunlight, as high temperatures may restrict their development. Tulips should be lifted every year unless they are planted very deeply. Daffodils need be lifted only every second year.

Chrysanthemum planting should be concluded, even in the latest districts, by setting out well-rooted plants of a variety suitable for border display. The soil should first be well dug and enriched with compost or manure.

Dahlias may well be planted out in cold districts where early planting is unwise, and in milder districts late pot tubers may be planted during November to give colourful display after the main crop has passed. Earlier plantings in mild districts will now be growing strongly and should be thinned, if necessary, by the removal of a number of the young shoots. These may be removed with a sharp knife, but pulling them away gently with the fingers may be found better in that it removes also the lower buds on the stems and prevents further growth from them. Staking will be necessary later, and the stakes should be almost as high as the flowering stems, so that the flowers will be only slightly above the tops of the stakes. The stems should be tied to the stakes with twine so they are unable to twist about in the wind and break off.

Gladioli, which will now be growing strongly in the early districts, should be staked unless they are very well sheltered. Each stake should be pushed into the ground 2 to 3in. behind the plant and each spike tied only loosely. Very firm tying may bruise and restrict the growth of the stems.

Hedges should be given their first clip of the season as soon as early growth makes them appear untidy. If the clippings are clean, they are a useful addition to the compost heap.

Herbaceous plants producing a large number of shoots can still be thinned by pulling superfluous shoots away, preferably with their roots. Strong shoots with roots attached may be used for filling spaces in the border.

Pot-grown fuchsias and heliotropes planted into the massed flower border add interest to the general bedding scheme. They will flower for many weeks during summer.

Shrubs which flower in spring and early summer on shoots produced last season—for example, flowering currants, forsythias, and lilacs—should be pruned as soon as flowering has stopped. Removal of shoots which have flowered encourages the growth of ample new ones to produce flowers next spring. Camellias, hydrangeas, rhododendrons, and azaleas should be mulched during November with well-rotted compost, sawdust, or leaf mould to help conserve moisture and maintain suitable soil conditions. If the soil is dry, it should be watered thoroughly before the mulch is given.

Pests and Diseases

Geranium rust ruins many geraniums each year by causing rusty-brown spots on the foliage. Fortnightly sprayings with 2 fl. oz. of lime sulphur and ½ fl. oz. of colloidal sulphur to 2 gallons of water will control this disease. Before the plants are sprayed affected leaves should be picked off and burnt. Care must be taken if the plants are growing against the house, for sulphur sprays readily discolour paintwork.

Greenflies will still be prevalent in many gardens, and measures against them should be continued by spraying at 10-day intervals with nicotine sulphate until they have disappeared.

Red spiders attack a wide variety of pot plants, and a careful watch should be kept for them from now on. The most efficient control measure is spraying with summer (white) oil. If only a few plants are to be treated, most of the red spiders can be eliminated by holding the plants upside down beneath a fast-running cold-water tap. The treatment should be repeated at frequent intervals until no sign of the pest remains.

Thrips often attack rhododendrons during summer, causing the leaves to assume a silvery appearance. The most effective spray against this pest is one prepared by mixing ½ fl. oz. of nicotine sulphate and 3 fl. oz. of summer spraying oil with 2 gallons of water. The summer spraying oil may be omitted, but 1oz. of soft soap must be thoroughly mixed with each 2 gallons of the spray to activate the nicotine.

Cotoneaster horizontalis

A PROSTRATE species of a large genus of shrubs, *Cotoneaster horizontalis* will grow 2 to 3ft. high. It is semi-deciduous, and its shoots project horizontally from the main branches as the bones of a fish radiate from the backbone. It is an excellent shrub to grow against a wall or bank or at the back of a large rock garden.

The pink-tinted, almost white flowers which appear in November are followed by numerous bright red berries extending along the branches, and these persist throughout autumn and into winter. The foliage, though small, often produces some autumn colouring also. As with most of the cotoneasters, this species will grow on a wide range of soil types. Pruning to shape and thinning out of any excess growth in winter are all the attention required to control the shrub.

Ripe seeds may be sown in a frame in autumn or spring. Containers of autumn-sown seed are stood outdoors during winter and placed in gentle heat in spring. Layering in autumn is another method of establishing young plants if suitable growth is available. Cuttings 3 to 4in. long may be prepared from firm but not fully ripened wood in January, February, or March and inserted in sandy soil in a close frame.

—H. P. THOMAS, Vegetable Instructor, Department of Agriculture, Wanganui

Photograph by Douglas Elliott.

BACHELOR COOKERY

MANY people who want to eat good, wholesome meals cannot afford to spend much time cooking them. The bachelor is by no means the only person who does not want to waste time in the kitchen. The housewife on holiday, if she is camping or baching, usually likes to lighten the burden of cooking three meals a day; the farmer when his wife is away, or the son of the house left in charge, must face the problem of preparing meals in a hurry while carrying on his ordinary work. Time-saving suggestions and some quick and easy recipes for basic dishes are given in this article by Helen Paine, Rural Sociologist, Department of Agriculture, Wellington.

THAT planning ahead is the important factor in preparing meals quickly is true, but that is no help to the people to whom cooking is a minor consideration and who always leave planning to the last few minutes. One solution to the problem of preparing meals easily may be to have a stock of good, simple, well-tried recipes that can be cooked at a moment's notice without much fuss.

Breakfast Dishes

For most people breakfast is basically much the same—stewed fruit or porridge usually followed by a more substantial dish.

Stewed Fruit

Just cover about a pound of fruit in a pot with water. Add ¼ cup of sugar and heat the fruit slowly with the lid on, until it is soft without letting the water boil. The amount of sugar needed varies with the quantity and ripeness of the fruit; taste the fruit when it is cooked and add more sugar if necessary.

Fruit can also be cooked in a covered ovenglass dish in the oven while other foods are cooking.

Porridge

Porridge is a breakfast favourite which can be made quickly in a pressure cooker. This method requires less water than others. To ¼ cup of oatmeal add ½ teaspoon of salt and ¾ cup of water and cook them in a pressure cooker for 10 minutes.

More Substantial Dishes

Egg dishes are described in the luncheon suggestions. Simple methods of cooking liver, kidneys, and grills are included in the section on meat cookery.

Rissoles can be made quite quickly out of left-over scraps. Chop up or mince any pieces of left-over meat and add a little chopped-up onion or chives, any left-over vegetable, and an egg if the mixture is very dry. Mould the mixture into balls and fry them in a little fat until the rissoles are thoroughly warmed and brown on the outside.

Left-over vegetables make a good breakfast by themselves if they are sliced and fried until brown, but, like most other breakfast dishes, they are improved greatly by the addition of a little fried bacon.

Tomatoes provide an easy breakfast dish. Cut them in halves into a frying pan, add salt, pepper, a teaspoon of sugar, and about ½ cup of water, and cook them until they are soft. If the tomatoes are turned face downward, a very rich juice forms around them.

Lunch Dishes

A quick lunch can often be prepared easily from left-over food from dinner of the night before. Salad in summer and soup in winter are both ideal for using up scraps.

Soups

Make a stock by soaking meat bones or meat cut into small pieces in cold salted water. Cook this stock with a cut-up onion for 2 or 3 hours in a pot or for ½ hour in a pressure cooker. Leave it to cool and skim the fat from the surface.

To this basic stock any scraps of food can be added and soup can be prepared afresh in a few minutes. Raw vegetables can be cut up and added to the stock, which must then be recooked until they are tender.

Salads

With a basis of lettuce, young cabbage, or any other suitable raw green vegetable, a salad can also make use of left-over foods and can become a staple part of the summer diet.

A good salad dressing that is easy to make is essential if salads are to be enjoyed in quantity and variety. A dressing which can be made in bulk, because it keeps well even in the hottest weather, contains these ingredients: 1 tin of sweetened condensed milk, 2 tablespoons of mustard, 1 teaspoon of salt, and 1 cup of vinegar. This mixture is very thick and should be diluted with an equal quantity of milk just before it is served.

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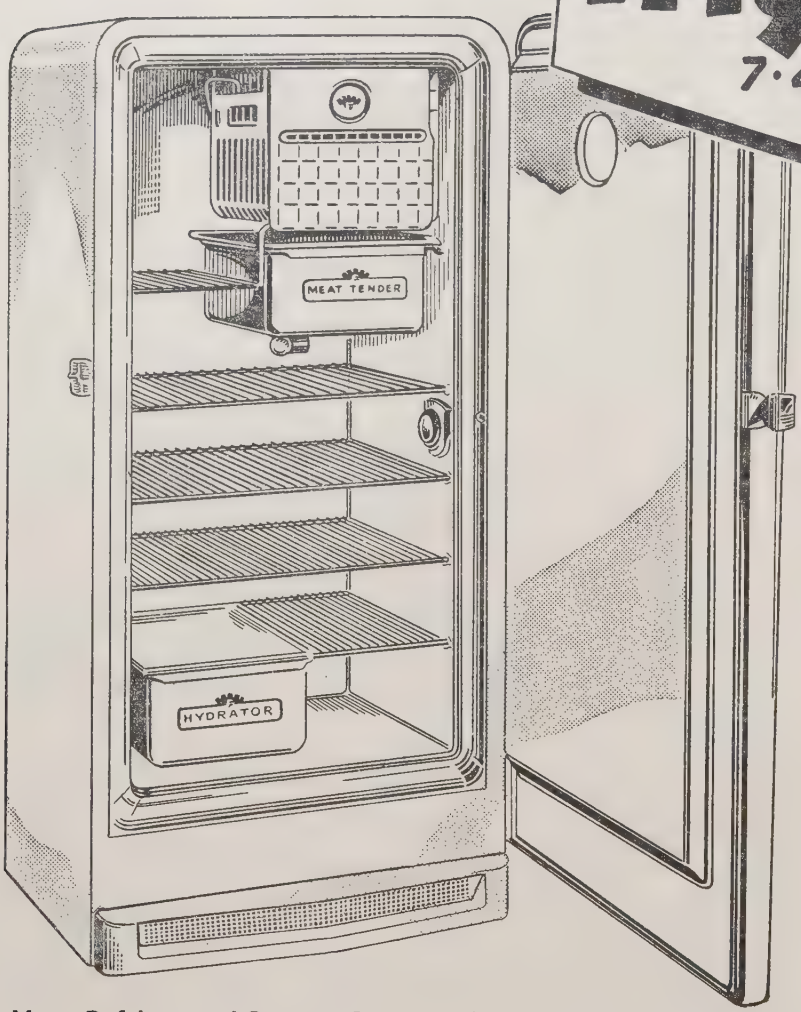

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Most vegetables, raw or cooked, and all fruits are suitable for salads. Mix them with the dressing and place them in a lettuce leaf or serve grated or small whole fruits with whole lettuce leaves. The addition of cold meat, fish, or cheese makes this lunch a more substantial meal. It takes little time to prepare and costs very little.

Egg and Cheese Recipes

Apart from soup in winter and salad in summer, some more substantial dishes may be required to vary the lunch menu. Most of these take longer to prepare, but a few easy egg and cheese dishes form wholesome and nutritious meals.

The bachelor is usually as adept as any practised cook at turning out poached or fried eggs, but sometimes needs a guide to scrambling them, for there are some pitfalls in making good scrambled eggs. Use only about 2 tablespoons of milk for each egg, or about ½ cup for 3 eggs. Add a lump of butter and salt and pepper to the egg and milk, then cook the mixture very slowly until it sets, stirring round the sides, as it sets there first. The mixture must not be allowed to boil or to cook too much; it is best taken off the heat before it is properly set and allowed to finish cooking in its own heat.

Baking is a very good method of cooking eggs if time is available for preparation—about an hour before the meal. Crack the eggs into a utensil that will stand oven heat, just cover them with milk, and crumble some bread into the mixture; parsley, grated cheese, or cut-up tomatoes may be added for variation. Bake the mixture in a moderate oven (350 degrees F.) until it is set.

Any left-over vegetable can be made into a wholesome lunch dish by covering it with a cheese sauce and baking it for a short time in the oven. The sauce is made as follows: Heat 1 cup of milk and a knob of butter until it is nearly boiling. Mix 2 tablespoons of flour with a little milk, salt, and pepper, and add them carefully to the hot milk, stirring so that lumps do not form. Stir the mixture until it boils, then cook it gently for 2 or 3 minutes. Add about ¼ cup of grated cheese as soon as the sauce is taken off the heat.

Dinner Dishes

Most of the lunch dishes described make use of left-over foods for the sake of economy, though they can, of course, be made with fresh foods. They are all simple recipes, but a dinner is more important and generally needs careful thought. Both buying and preparation need more planning. The choice of meat is usually the first consideration and that on which the selection of the other constituents of the meal is based. Perhaps the wisest classification of meats for the busy cook is into quick- and slow-cooking types.

Quickly Cooked Meats

Good mutton chops, undercut or rump steak, and veal steak are the most usual grills. They should all be cooked on a hot grill for about 5 minutes on either side, or in a frying pan with only enough fat to stop the meat from sticking to the bottom of the pan. These meats are all easy to prepare and cook, but they are the expensive cuts. Liver, however, is both quickly cooked and cheap.

A casserole meal takes several hours to cook, but it can be put in the oven at lunchtime to cook in time for dinner, or it can be cooked the previous night and reheated.

Fried Liver

Cut the liver into fine slivers, coat them in flour, and fry them in a very little fat until they turn brown. If the liver is cut very fine, it needs only about 2 minutes' cooking on either side.

Sheeps' kidneys, sausages, and a few other cheaper meats can also be cooked by this method or by being grilled, and all form the basis of a simple meal. Fish, too, can be grilled or fried very quickly.

Minced Beef Cakes

1lb. of minced beef	1 large onion, chopped up
1 cup of crumbed bread	1 egg

Mix the ingredients with ½ cup of left-over gravy, tomato sauce, or any other savoury liquid. Even water and meat or vegetable extract gives a good flavour to the mince cake. Grill the mince in a solid lump, mould it into small cakes and cook them in a frying pan, or bake them in a moderate oven (350 degrees F.) for about ½ hour. These quantities make four servings.

Meats that Need Long Cooking

For people who work away from home the cooking of the cheap meats, which need longer cooking than the expensive types, is a problem. The usual ways of cooking these cuts of beef and mutton are stewing or braising or in a casserole in the oven. All these methods take 3 to 4 hours and therefore are difficult for anyone but the housewife who is at home all day. However, there are three possible solutions to the problem.

1. If a casserole can be put in the oven at lunchtime, the meat will cook satisfactorily at a low temperature in time for the evening meal. The oven must be able to be regulated to a constant temperature if the meal is to be left unattended.

2. A casserole or a stew can be cooked the night before it is needed and reheated. This method requires some planning and forethought, but the effort is worth while if there is no alternative.

3. A pressure cooker provides one of the best methods of cooking the cheaper cuts of meat. In it a stew which has all the flavour and nutritive value of a casserole can be cooked in 20 minutes.

The following recipes are suitable for cooking by any of those three methods: —

Beef Stew

1½lb. of stewing beef	1 carrot or other root vegetable
1 or 2 kidneys	¼ cup of flour
1 teaspoon of salt	
1 large onion	

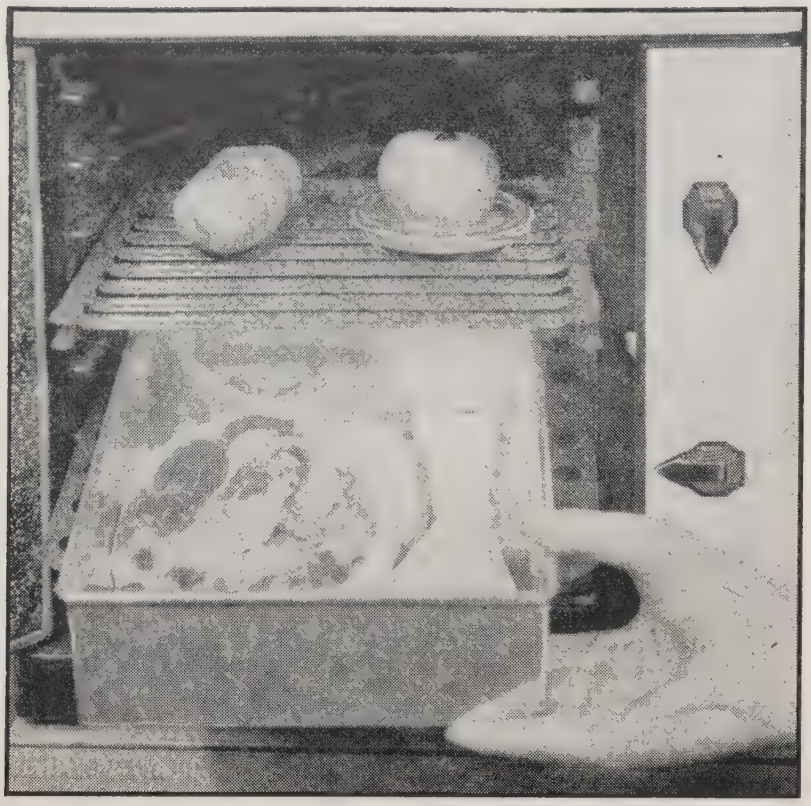
Cut the beef into inch cubes, the kidneys into quarters, and the vegetables into pieces. Sprinkle them with flour, place them in a casserole dish, pressure cooker, or pot, and add the salt and 1 cup of water. If the stew is in a casserole, cook it in a slow oven at about 325 degrees F. for 3 hours; if it is in a pot, leave it simmering slowly, but not boiling, for about the same time. In a pressure cooker the stew should be cooked for 20 minutes, and potatoes can be cooked with it by placing whole large potatoes on top of the meat and vegetables. The quantities given are sufficient for four servings.

Other Meats

Other meats that can be cooked by these methods are the poorer grades of mutton chops (neck chops), breast and flank of mutton, rabbit, and neck and breast of veal. Coat the meat with flour, brown it in a small quantity of fat, and cook it slowly in the oven or in a pressure cooker. Any vegetables can be used in these dishes, but onions are almost essential to bring out the flavour in a stew.

Roasting Meat

Of the other ways of cooking meat, roasting is the most important. The middle-grade cuts are used for roasting. If they are thick, they may need up to 3 or 4 hours' cooking, but thin steak and leg chops of mutton cooked for about an hour in a moderate oven make tender meat dishes. They are not as tender and juicy as the expensive grilling cuts, but are a satisfactory substitute if they are well cooked.



If time is available for preparation, a meal can be planned so that all the constituents can be cooked in the oven at the same time.

Suitable meats for roasting are veal steaks and leg-of-mutton chops. Dip the meat in flour, or, if the dish is required for a special occasion, dip it into a mixture of egg and milk and coat it in dried breadcrumbs. Bake it in an oven at 350 degrees F. in a very little fat for about an hour.

Curry

Scraps of cooked meat may be used up satisfactorily by making them into a curry and serving them with a generous helping of rice or potatoes. The success of this dish depends on the quality of the curry powder used.

Melt 1 tablespoon of fat in a pot, and when it is hot add a finely chopped onion and brown it thoroughly. Then add the curry powder, the amount depending on the quantity of the meat and the quality of the curry powder; an amount is usually suggested on the packet or tin of curry powder, but about 1 teaspoon per person is an average quantity. The curry powder is cooked in the hot fat, and then water, stock, or any other savoury liquid is added. Left-over gravy is most suitable, as it does not need thickening, but any other liquid must be thickened by adding 1 or 2 tablespoons of flour mixed with enough water to make a paste. The meat, cut into small cubes, is added just before the curry is served and should be cooked long enough to be heated, but not so long that it becomes tough.

Savoury Hash

Another method of using up cold meat is to make a savoury hash. Mince or cube the meat, mix it with left-over gravy, tomato sauce, or similar liquid, and add a small amount of cooked onion, parsley, or chives. Season the mixture with salt, pepper, herbs if they are available, and a few cloves; an egg may be added to thicken it if necessary. Put the mixture in a baking dish and cover it with mashed or sliced potatoes. Bake the hash in a moderate oven so that the inside is heated and the potatoes browned. About 325 degrees is hot enough, but the heat should be turned up at the end of the cooking time to brown the top.

Cooking Vegetables

A pressure cooker is a great asset in quick cooking of vegetables. Vegetables for one person or a small family can all be cooked together in about 10 minutes. A pressure cooker is also ideal for cooking a whole meal on a camping expedition, where a liquid-fuel stove is usually the only source of heat. The vegetables must be chosen so that they all cook in about the same time. Potatoes and root vegetables take longest to cook, but do not tend to overcook as easily as cauliflower and green vegetables. If the quickly cooked vegetables are placed in a container, they will cook more slowly and be ready with the rest of the vegetables.

If a pressure cooker is not available, there are many other ways of cooking vegetables, of which boiling is quickest. Vegetables should be cooked in boiling salted water until they are tender. Though boiling is quickest, other methods—oven cooking in particular—require less attention. Many vegetables may be baked or roasted in the oven, and others may be cooked in a casserole with milk.

Potatoes may be washed and baked in a hot oven (about 400 degrees F.) for 1 hour or until they are soft.

Potatoes, pumpkin, carrots, parsnips, and kumaras may all be roasted successfully. Melt some fat in a roasting dish and cook the vegetables in it at a temperature of about 400 degrees for 1 hour.

For scalloped potatoes cut them into slices in an ovenglass or similar dish, cover them with milk, add salt and pepper, and cook them in a moderate oven (350 degrees F.) for about 1 hour. This dish may be easily converted into a savoury lunch meal by the addition of onion or tomatoes. Cauliflower can be cooked similarly; the sauce does not thicken as it does with scalloped potatoes, but flour can be added to the milky sauce just before serving the dish.

Many vegetables, and especially carrots, can be cooked in the oven by cutting them into small rounds or cubes and adding a little water and a knob of butter. This method of cooking takes a little longer than boiling, but the vegetables require little attention except the addition of extra moisture if it is needed.

Cooking a Whole Meal at Once

When a little extra time is available for preparation, a good way of cooking a whole meal is to plan so that everything can be cooked in the oven. For instance, in a small oven one shelf may be occupied by a roasting dish containing leg chops and perhaps two roast vegetables; baked potatoes and whole stuffed apples on the other shelf would complete the dinner. Each of these dishes takes about an hour to cook in a moderate oven, and none of them would be spoilt in a few extra minutes, so the cook can leave the meal to take care of itself.

Many other variations of this and similar meals are possible. Meat, potatoes, and a pudding can be cooked in the oven and vegetables cooked quickly in a pressure cooker a few minutes before the meal is to be served. All the vegetables may be cooked by one of the oven methods and served with a grill, which can be prepared when the rest of the meal is nearly ready.

Scope for Improvisation

In this article it has been assumed that the bachelor has few of the appliances of the kitchen about him and not many of the special condiments and flavourings. The camping family is in the same position. Therefore these recipes are designed for use where cooking conditions are not ideal and improvisation is necessary.

Having learnt to prepare a good breakfast, conjure up a quick lunch, and cook a satisfying meal of meat and vegetables, the bachelor will probably be pleased with his progress as a cook. Further adventures in the culinary world are beyond the scope of this article, but, having once mastered the basic methods of cooking, an enthusiast will find that many other sources of information are available.

Plastic Films!

Making Gifts from Attractive Patterns

TRANSPARENT or semi-transparent plastic films are at present available by the yard in most softgoods stores, and as they have attractive patterns, handsome gifts can be made from them. In this article Nell Macpherson, Rural Sociologist, Department of Agriculture, Auckland, describes the making of some plastic articles which do not need to be sewn.

PLASTIC film has certain properties which are most useful. It is waterproof, non-porous, resistant to soiling, does not require ironing, and may be laundered by wiping with a damp cloth. However, as it is a film and not a fabric, every hole made in it weakens it. This necessitates special sewing methods which have been described in previous articles in the "Journal". It is inflammable, but not more so than most fabrics made of either natural or synthetic fibres.

Because it is waterproof and resistant to soiling, it is especially suited to use where there are young children in a family, as it saves time and energy in washing when children spill liquids over it.

Table Cover

To make a plastic table cover take 1¼yds. of 36in. plastic film and scallop the edges. Cut a pattern for the scallops by tracing round the edge of a saucer as shown in the illustration below. The size of the scallops may be varied by the size of the object traced; for example, an ink bottle makes a small scallop.

Place the pattern on the folded plastic film and hold it with paper clips. Cut out the scallops, and the table cover is made. It will resist both water paints and inks.

Tray Cloths and Wagon Cloths

Measure the tray or wagon to be covered and cut oblongs in floral plastic film to fit them. These "cloths" remain clean for a long time, but if anything is spilt on them, they should be wiped with a cloth wrung out in warm water. The ease with which these covers are cleaned saves work when invalid or convalescent children have to be nursed.

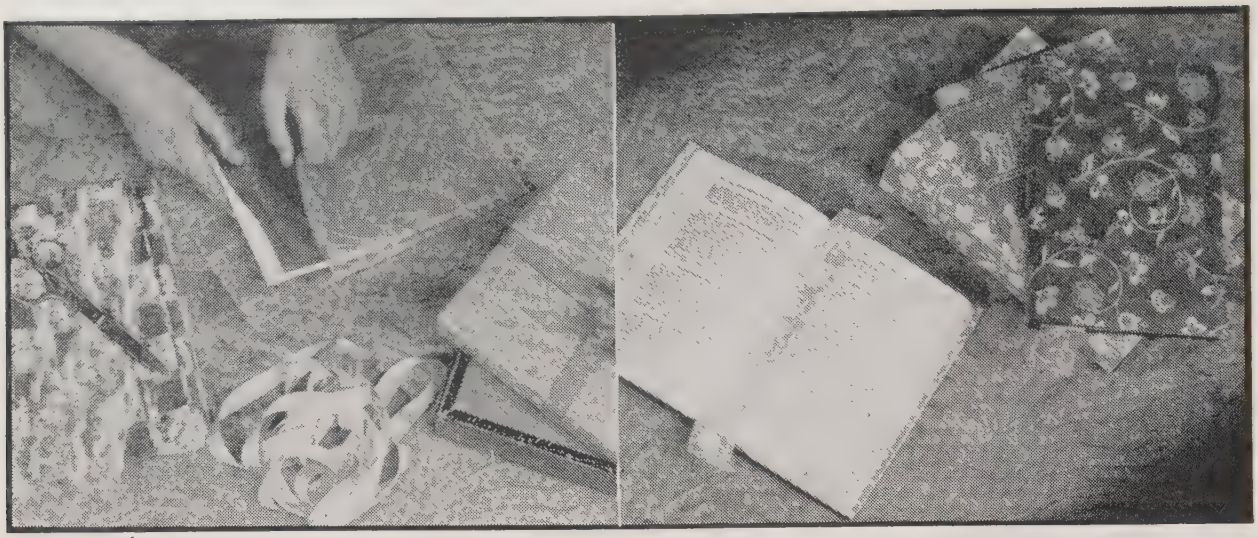
Similarly a plain sheet of plastic, say, 36in. x 18in., is useful as a cover for a convalescent's bed. This cover protects bedding from becoming soiled and when it is spread on a bed a child can colour pictures or paste cut-outs in a book.

Bread Cloth

When bread has to be kept over the weekend it tends to dry out after a day or two. A sheet of plastic wrapped round the bread seems to keep it fresh for a longer time and at the same time keeps it clean.

Plastic sheets are invaluable at the beach. They can be used for picnic cloths which will not let the sand through and wrappers for wet swim suits and towels. A quick dip in cold

Left—Method of using a saucer to draw a paper pattern for scallops. Right—Cutting the scallops on a plastic table cover.



Left—A plastic stocking bag which holds 4 to 6 pairs of stockings. Right—Plastic book covers and markers.

water will clean them and they may be hung to drain over a clothes-line. As plastic is waterproof, wrappers containing wet swimming clothes will not damp those things with which they come in contact; nor do they take as long to dry as canvas bags.

Lunch Wrap

A piece of plastic 18in. x 18in. makes an excellent wrap for a school lunch. The sandwiches do not dry as much as they do in other wraps, and moist sandwiches, such as those made with scrambled eggs, can be carried without any leakage. If the initials of the owner are glued on to the plastic, the wrap is easily identified. Any good waterproof glue will fix the initials.

Table Mats

Table mats can be made of either light plastic film or the heavier weight, which is very similar to American cloth in appearance. The advantage of using the heavier film is that it is more heat resistant than the light and will not crinkle or crepe even if a hot plate is placed on it. These mats may be any size, but with a squared pattern, as in those illustrated, 11in. x 9in. is a useful size for a place setting.

Book Covers and Bookmarks

With the pretty patterns of plastic at present available pleasing bookmarks and book covers can be made. They consist simply of straight pieces of plastic cut to the correct size.

Gifts Made by Using Glue

Many other gifts can be made by using glue. Tube glue of the type used for making model aeroplanes is probably the most suitable.

A motif or a decorative border may be glued on to plain plastic to brighten a cloth for a child's high chair. These borders are attractive additions to table centres and runners and dressing-table mats.

A useful gift for a person who does much travelling is a plastic stocking bag. The one illustrated is made from a strip of plastic 18in. x 9in. and will hold 4 to 6 pairs of stockings. One end is folded over the other, leaving 3in. free for a closing flap. The edges are glued together and turned to the front and glued down. A decorative border is then glued on to the flap. A brush and comb bag and a shoe bag may be made in the same way.

There are many other ways of using plastic film, and shower, kitchen, or bathroom curtains can be made with a sewing machine. Following are the main points in the technique of sewing plastic:—

Holes in plastic weaken the film, and tears often start from them, so the fewer holes made the better. A long stitch with loose tension is therefore advisable.

Two rows of stitching should not be placed close together. The seams should not be finished in any of the usual ways. They should be merely trimmed neatly.

If the plastic film sticks a little in the sewing a drop of machine oil along the line of sewing will make it move easily.

Pins, of course, should never be used, as they make holes, but adhesive cellulose tape, stamp hinges, or weights such as pennies could be used to hold the pattern in place. Do not tack the edges, but use paper clips to hold them together for sewing.

Substitutes for Sugar and Cooking Chocolate

SUBSTITUTING honey for sugar and cocoa for cooking chocolate enables the housewife to try new recipes or vary old ones. Cooking chocolate has been unobtainable in New Zealand for some time, but many delectable recipes from overseas demand its use. Honey, because it is relatively expensive and sometimes scarce, is not usually substituted for sugar, but it is very useful when sugar is in short supply or to give new and interesting flavours to cakes, biscuits, and puddings.

Honey for Sugar

Honey is a little sweeter than sugar and more compact; about a sixth of its bulk is water. To replace 1 cup of sugar in a recipe use 2/3 cup of honey and reduce the amount of liquid by 3 tablespoons. If only a small proportion of honey is used—for example, ¼ cup of honey and ¾ cup of sugar—no adjustment of quantity or liquid need be made.

Honey which has become hard and crystalline should be melted over hot water before it is measured or it will not pack closely into the cup and the measurement will be inaccurate. Heating or greasing the cup or spoon makes the honey pour in and out more easily. Honey makes foods darker, moister, and a little sweeter.

Cocoa for Cooking Chocolate

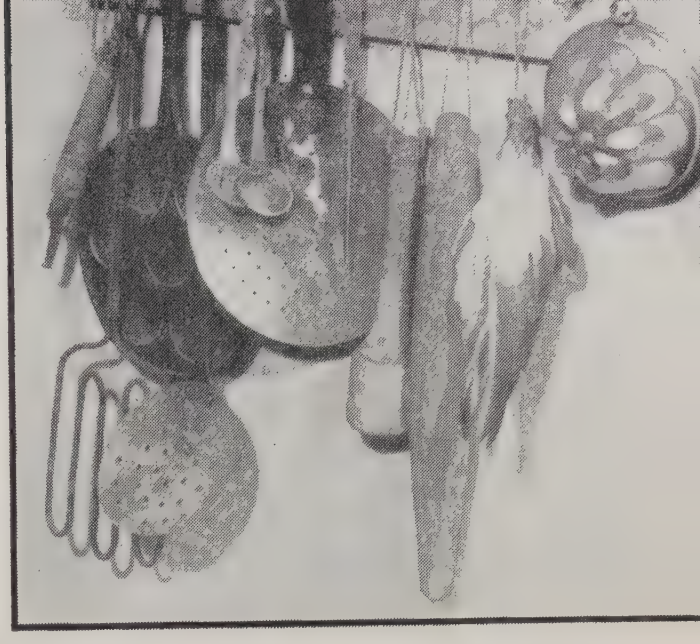
Cooking chocolate, dark and unsweetened, is made in large blocks or 1oz. squares. Cocoa is made by extracting fat (cocoa butter) and moisture from raw chocolate, so these two constituents must be replaced. The smooth texture of the true chocolate cannot quite be achieved.

For 1oz. (one square) of chocolate substitute 3 level measuring tablespoons (¾oz.) of cocoa and ½ level measuring tablespoon (¼oz.) of butter. Heat the butter with 1 tablespoon of water, stir in the cocoa, and cook the mixture for a moment or two. It must be watched carefully as it is likely to burn.

—*NORMA K. METSON,*
Rural Sociologist, Department of Agriculture, Wellington

The Farmhouse Kitchen in New Zealand

IN the first article in this series, published in last month's issue of the "Journal", Evelyn E. Moore, Rural Sociologist, Department of Agriculture, Palmerston North, described the courage and initiative of pioneer women in making homes for their families under great difficulties. This article discusses the resourcefulness of these women in providing satisfying meals not only under extremely inconvenient conditions, but in the face of acute food shortages. The last article, which will appear in next month's issue, will deal with the development of the convenient and attractive kitchen which is characteristic of the modernised and newly built farmhouses of today.



Utensils common in the farmhouse kitchen last century. These early designs make an interesting comparison with those of similar articles today. From left—Tin-opener, gridiron, muffin pan, long-handled skimmer, wooden spoons, large skimmer, metal skewer, potato masher, rolling pin, wing feathers, jelly mould.

STORIES of acute starvation in early New Zealand are fortunately rare, but some settlers from time to time were much reduced in strength before they obtained fresh supplies of food. In the north friendly Maoris were always willing to help with information about edible native fruits and would exchange some of their usually ample store of kumaras or potatoes, and sometimes of melons, peaches, corn, mutton birds, or fish, for clothing or other materials they desired.

In both islands wild pigs were plentiful, and native pigeons, quail, ducks, kakas, and fish or eels were used to eke out supplies of other food, this game being often the only meat available for months at a time. In the circumstances the colonists can scarcely be blamed for the hand they had in the destruction of some native birds, or even for the introduction of rabbits, for in some districts at first rabbits were a very welcome addition to the menu.

Nevertheless such food became very monotonous. If a sufficiently large trough in which to scald wild pigs was not available, the pigs' hair had to be burnt off, which often left the meat with a burnt flavour. In autumn the pigs were fat, and if young, they were tender and succulent, but in spring they were often lean, tough, stringy, and unpalatable, and, when the salt supply ran out, savourless as well.

Shortages of Salt

Salt was often difficult to obtain and comparatively expensive in those early years, early newspaper advertisements and price lists showing that it cost up to 1s. 6d. a pound. When it could be spared, however, it was used to salt hams and fish, which were hung up to smoke in the wide cob or stone chimneys.

After the first 2 or 3 years, when a vegetable garden had been established with the precious seeds brought from home and the first small crop of corn or wheat harvested completely by hand, food supplies, if monotonous, were reasonably assured. Before that, whenever the New Zealand Company ships failed to arrive on time, settlers were reduced to such expedients as digging up potatoes, eating them, and planting the peelings or making the flour supplies go further in a thin gruel. It is even stated that a settler with a barrel of old ship's biscuits full of weevil picked them over carefully, brushed off the webs, broke them up with a hammer, soaked and boiled them, and made them into puddings. Sow-thistle (rauriki) was often the only green vegetable the settlers had and it must have been valuable in the prevention of scurvy.

In summer fruit was plentiful in many North Island districts, for the missionaries, arriving in 1814, had carried the seeds of fruit trees with them and taught the Maoris to plant them. In Taranaki cape gooseberries grew well and were used for jam and fruit pies; peaches grew wild, especially in the Waikato district, and were free of the diseases which were later to destroy them; melons, introduced by Captain Cook, were widely cultivated by the Maoris, and apple, quince, and other fruit trees were also growing.

Use of Native Plants for Food

The pioneers' use of native plants, apart from kumaras, though fairly common, seems to have been restricted to times when supplies of other foods were short or when they tired of a diet of pork, potatoes and potato scones, damper, lard, and perhaps bread. Cows were costly, sometimes selling for £15 or £20, and the salt butter imported from Australia was expensive and often rancid.

A concoction of manuka leaves or bidi-bidi or a mixture of these was sometimes used when supplies of tea were low, but it seems to have been a very poor substitute. A large variety of native fruits and plants was used in pies; among them were fuchsia berries, the tightly curled new buds of ferns, which one woman describes as being sweet and liked by children, and the central heart of the tree fern. With all its leaves peeled off the heart of the tree fern looked rather like a turnip. It was cut into small pieces and with the addition of vinegar, sugar, and cloves is reported to have made quite a palatable pie.

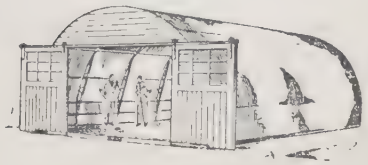
Other foods used occasionally included the fruit of the kiekie or gi gi (*Freycinetia banksi*), a climber with long spear-like leaves. The edible fruit grows from the base of a protecting group of leaves and when unripe resembles the white of boiled egg. As it ripens it becomes darker and more juicy and develops a texture like a ripe pear. It was highly regarded as a food, but, except in certain seasons, was hard to obtain.

The central hearts of nikaus and cabbage trees were also sometimes used as vegetables, chiefly as a change from a monotonous diet. The berries of many native trees such as the tawa, karaka, titoki, and even the tutu which the Maoris are all reported to have used needed to be gathered when absolutely ripe and usually required treating in some way; that is, fermenting or squashing and straining, only the juice being used. The settlers had not the time to spare for the arduous task of gathering sufficient ripe berries for a meal when other foods were available, let alone straining and fermenting them, often to find the resultant concoction to be undrinkable.

Treatment of Poisonous Berries

Several of these berries are extremely poisonous unless properly treated. Thus, though the fleshy covering of the karaka, carefully separated from the kernel, makes quite a pleasant though tasteless pulp when used raw as a fruit, the raw kernel has a disagreeable flavour and is poisonous, causing contraction and rigidity of the muscles. After being boiled for 24 hours (the Maoris in the

PREFABRICATED



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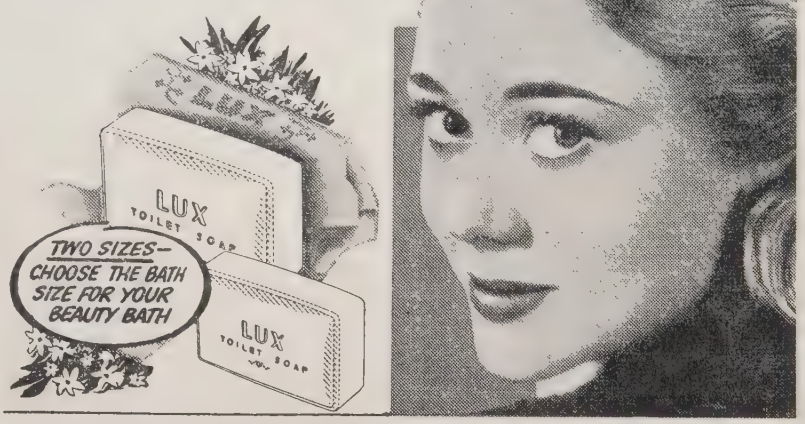

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thermal regions left them overnight in the hot pools), rinsed, and washed in clean water for several hours, the kernels when dried and pulped make a harmless but uninviting mealy food.

The seeds of the tutu berry are also very poisonous, but the juice from the berries after they are squashed and the pulp is strained makes a palatable drink; if fermented with sugar, it makes a pleasant wine. The remedial treatment for tutu poisoning used by the Maoris was an emetic drink made from the pepper tree (horopito) leaves.

The use of fern or bracken roots as food seems usually to have been a last resort, the Maoris also preferring wheat flour; in addition edible roots were not easy to find. Only some of those found in rich, loose soils were sufficiently tender, for, unless they were crisp enough to break easily when bent, they contained too much fibre. The choice, tender roots were roasted in the ashes and bruised on a flat stone so that the long wiry fibres could be easily drawn out before eating. The Maoris pounded this mess until it acquired the consistency of a tough dough and then steamed or rebaked it so that it resembled a kind of bread.

Docks seem to have made their unwelcome appearance fairly soon, as the use of the thick, fresh, green stalks as a substitute for rhubarb in pies is remembered, and as early as 1843 dock leaves were used in medicines by pioneer housewives.

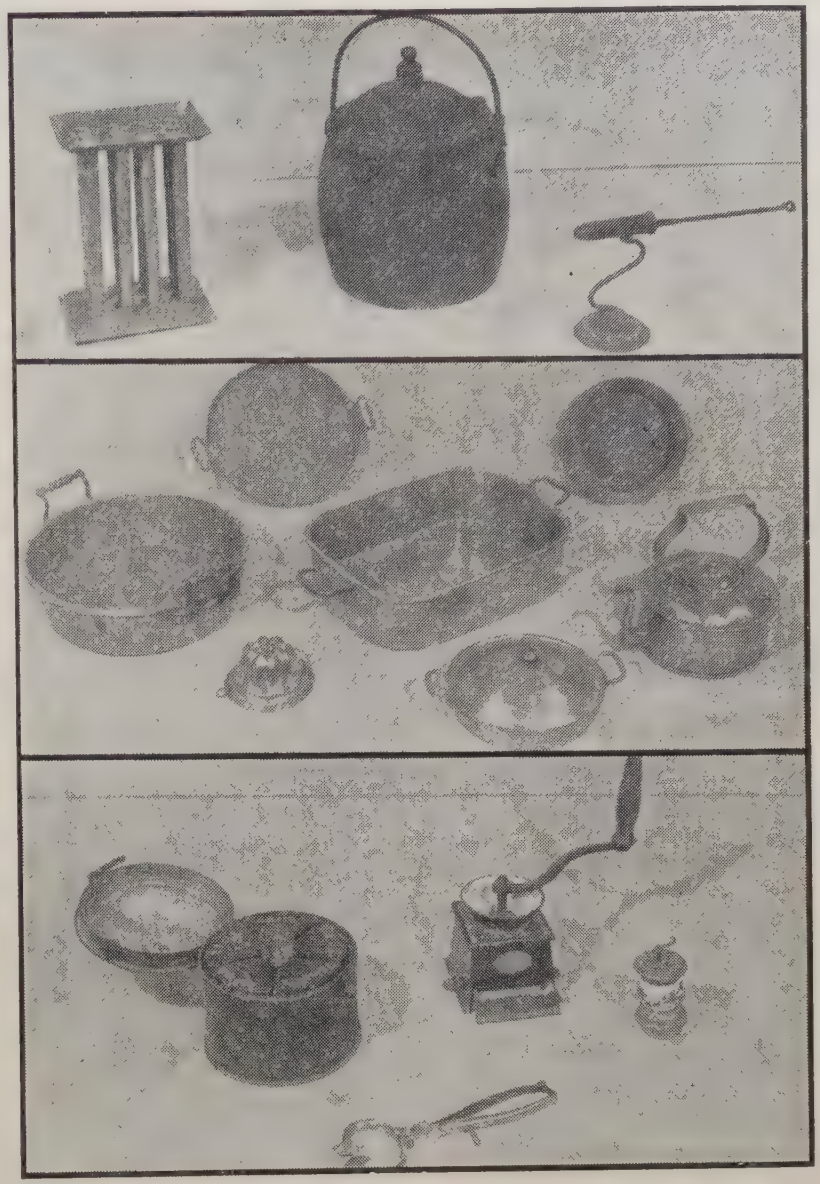
When vinegar could be obtained the women used a wide variety of plants to make pickles, a welcome addition to a diet consisting mainly of bread, cereals, and meat. The chopped-up, tender, white heart of the nikau palm was popular and was used to make a pickle somewhat like cabbage pickles.

Although many of the early pioneers resorted to these expedients in time of food scarcity, native food was not very popular, and vegetable gardens, fruit trees, wheat, and corn were planted as soon as possible. In the North Island these grew well in the shelter of the bush and as they were free from the diseases which were later introduced, most settlers soon became relatively independent of the towns for their most important food supplies.

Heart-breaking Gardening

In Canterbury and Central Otago and other parts of the country, however, gardening was by no means as easy. Frost, drought, and frequently a complete lack of shelter made the establishment of a garden a heart-breaking task, and the story of one woman who had her newly sown garden completely blown away and who found traces of it later in a sheltered hollow about a mile away was probably typical of the lot of many pioneers. Potatoes were often their only vegetable for weeks at a time, and the danger of starvation through being snowed in or cut off by flooded rivers was real to many. One woman, writing of her experiences of a very heavy snowstorm in 1867, describes how her family had eaten everything in the house and were down to the last of their poor, starved fowls when help and supplies at last arrived.

As considerable capital was required to pay the company for the land, stock it with sheep, and pay the necessary shepherds and other employees until the run or station was well established,



Examples of kitchen utensils used in the early days of New Zealand, when the labour-saving devices and convenient packeted foods of today were unknown. The spice tin and grater, the coffee and pepper mills, the sugar cutter, and the candle moulds are examples of equipment then necessary but rarely used in homes today. The digester (top middle), which was an early form of pressure cooker, the goffering iron (top right), which was used for making a thin, crinkly kind of batter cake or for putting a decorative frill on starched clothes, and copper pans were not common in pioneer homes, but belong to a later period.

most settlers on sheep farms had come from comparatively wealthy English families. Consequently, though these women were usually far more isolated than the wives of the small farmers with their 25-, 50-, and 100-acre blocks of bush, they were able to afford better homes, and bullock wagon transport across the open tussock country made it easier to obtain such luxuries as pianos, dining tables, sideboards, and other furniture shipped from Britain. For example, one woman writes of planning her house to fit the carpets brought out from home and having the timber milled in kauri and sent together with fittings, which were at first mainly imported from America, the 60 miles up country by bullock wagon. She had an attractive, well-furnished home and was able to afford domestic help when it was obtainable, for it seems to have been just as scarce in the 1850's and 1860's as it is today.

In such homes cooking for large numbers was the rule. There was usually a big family to cater for and at first, or when there was no station cook, all the station hands as well. In addition the hospitality and generosity of these people were such that having 12 or 14 guests for a meal was by no

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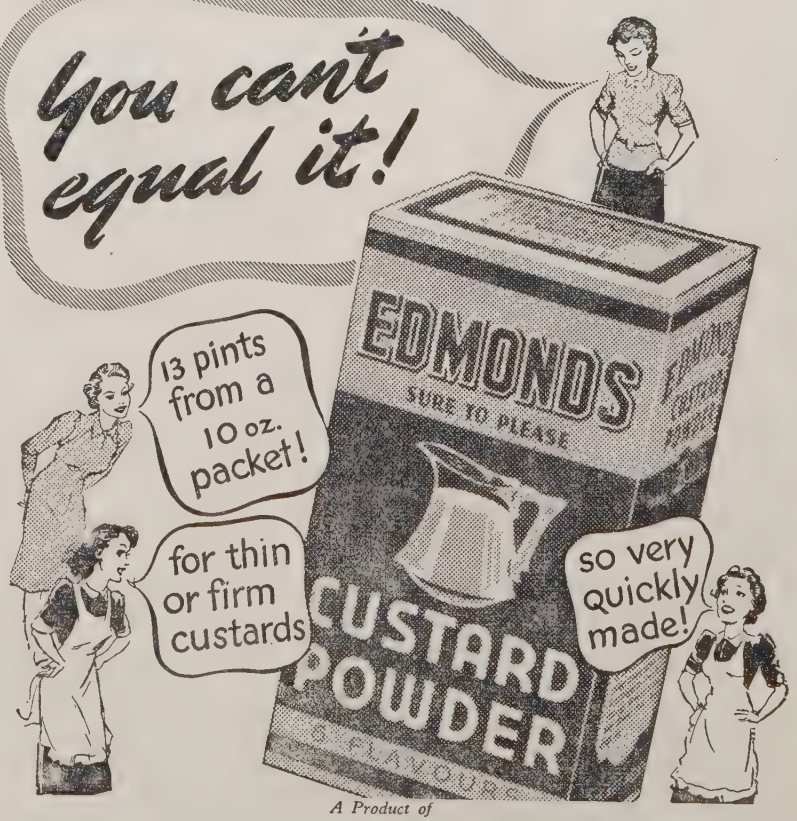

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means uncommon; one early homestead visitors' book contained more than 10,000 names. Therefore besides the big open fire, with its sweigh and space for two or three camp ovens, and the big iron boiler, holding 5 or 6 gallons of water, there was often a brick oven which was heated once or twice a week for baking bread, pies, scones, and cakes. Some pioneer homes also used two 5-gallon linseed oil drums as ovens; they were fitted with shelves and doors by a blacksmith and placed on either side of the fire. They were connected across the fire by iron bars on which the pots and kettles rested.

Difficulties of Bread Making

Baking bread in those days was a serious matter. Milled flour was used whenever possible, but the flour sometimes had to be ground by hand, usually in a small coffee mill, a slow, noisy, wearisome task at which all the children would take turns, hours of hard work being sometimes necessary to produce sufficient flour for the weekly baking. Bread leaven or "spon" yeast was sometimes made from boiled hops and scalded milk which was allowed to ferment before the addition of the required amount of mashed potatoes. Some farmers' wives obtained a piece of dough ready for the oven from the baker, mixed it with lukewarm water, and added it to the flour previously mixed with salt, kneading in more flour until the dough was of the required consistency.

Such yeast worked slowly and the dough was usually set overnight. It was then cut down, shaped into loaves, and set to rise again while the oven was being prepared. If yeast dough was used for a raising agent, a small piece was cut off and stored in the flour for future use. This was more or less the equivalent of the American "sour dough" bread.

Preference for Manuka Firing

The brick oven, which was perhaps big enough to hold 20 or more loaves at once, was heated by a wood fire burning on the oven sole; manuka was preferred for firing, as it gave a high, steady heat. When enough wood had been burnt to give the bricks the correct appearance of quivering whiteness—for the judging of which some experience was required, as there were no thermometers—the ashes were raked out and the oven brushed clean with a moistened broom. The baking was then put in the oven, loaves and meat at the back if other foods were being baked and pies, cakes, and scones near the front where they could easily be retrieved when cooked.

Other women had to rely on the camp oven, in which failures were even more likely until the way to use it correctly had been learnt. It is to the credit of these women that the crusty camp oven bread that was baked under great difficulties was long remembered by their children.

Sometimes French loaves were baked by lighting a fire on the clay hearth to heat it thoroughly, brushing the hearth clean, placing the prepared loaf in the centre, and covering it with a heated heavy iron pot with embers on top of the pot to brown the loaf. More often it was baked in a camp oven hung from a hook over the fire or placed directly on the embers. The heated lid was placed on the oven with a shovelful of embers on top. The fire had to be carefully tended to keep the heat even, and the embers on top had to be renewed at the correct moment. The oven was turned occasionally so that the bread baked evenly.

Besides meat and bread, damper and potato scones, which needed no raising agents and which were comparatively easy to make, formed the mainstay of many bush diets. Bread tended to be something of a luxury because of the time and care required in its preparation and baking, which were often done in a damp, draughty hut with no reliable means of regulating either the temperature of the dough or the oven. Damper, as described in the reminiscences of the pioneer women, seems to have been quite edible, in comparison with the burnt, rather sticky mess many amateur damper makers turn out today.

According to one woman the method of making dampers was as follows:—

Flour, water, and a little salt were mixed quickly to a soft dough and shaped into a cake about the size of a dinner plate and less than 1in. thick. It was cooked by cleaning aside the embers from a hot wood fire and placing the cake on the heated hearth. Hot wood ashes were then placed on the cake to a depth of 2 or 3in. and it was left until both sides were brown and crisp. It was then split down the middle, spread with butter or dripping, and eaten immediately.

Scarcity of Fats

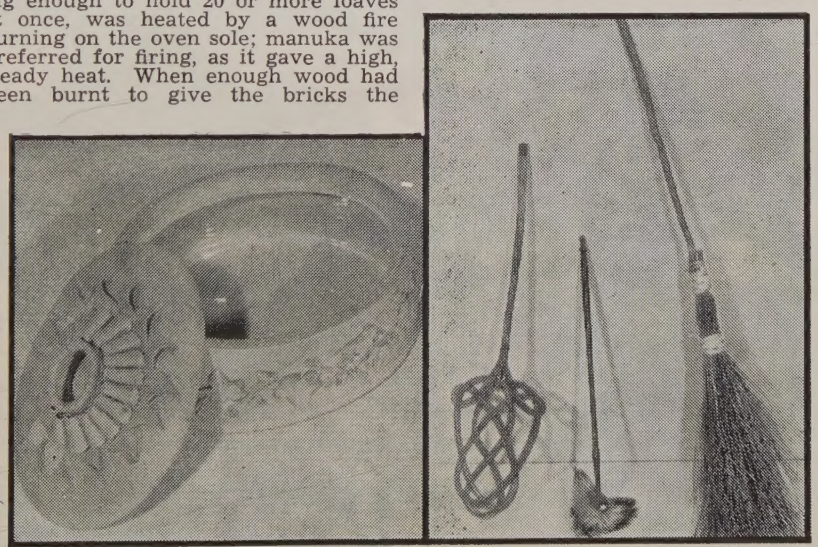
Fats were often scarce and were used carefully during the early years so that they could be saved for soap, candles, and for use in the evil-smelling slush lamps. That the settlers learnt never to waste a scrap of food is shown by one woman's recipe for shortbread: The cracknels from rendered-down fat were pounded into fine crumbs, rubbed into a portion of flour and sugar, and moulded with an egg.

The clean rendered-down mutton fat was used for tallow candles, hand made in the candle moulds, and soft lard and dripping, which were often all the fat the bush settlers had, were used in slush lamps. There were several varieties of these, all apparently equally objectionable. They consisted basically of a tin container usually an old tin pannikin or jam tin which was sometimes weighted at the bottom with clay or sand. Into it was pushed a small stick wrapped around with a piece of rag which had been saturated with melted fat. The tin was then filled with fat and the rag set alight. It seems to have produced a somewhat better light than the tallow candle which required frequent snuffing to prevent it from smoking and smelling badly, but it smelt a great deal worse.

In whaling settlements whale or shark oil was sometimes used instead of fat, but the rag-wrapped stick then had to be anchored firmly in a hollowed potato or by some other means.

Soap making further tried the ingenuity and patience of the pioneer woman. Being without any soda, she had to make her own lye from clean grey wood ashes. The camp oven was filled with ashes and as much water added as it would conveniently hold. It was boiled slowly for some time and then cooled and the lye was strained off and boiled with fat; this made a soft soap which was, however, often rather harsh.

As all these skills, in the absence of any really useful books, had to be learnt slowly by experience and doubtless with many failures, it is hardly surprising that New Zealand women became intensely proud of their housekeeping prowess, a fact which has often caused comment by overseas visitors, and, as the tradition has to some extent been carried on, still does today.



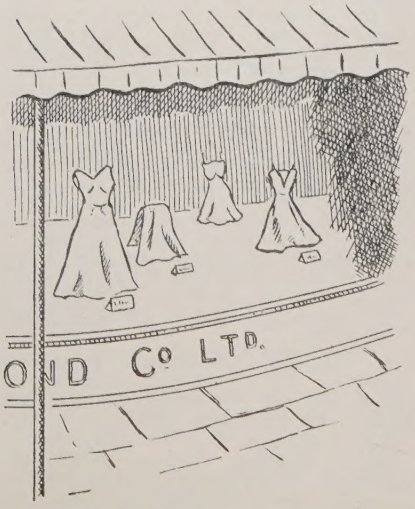
Early household equipment was often a strange mixture of elaborately decorated belongings characteristic of Victorian Britain and primitive articles made from materials which came easily to hand. Such a contrast is provided by the earthenware pie-dish and twig broom above. The other two articles on the right are a carpet beater and a duster.

Feather-weight Wool Fabrics for Underwear

WOOL has travelled far since the days of grandmother's severely practical flannel underwear, and some people will be surprised when they see and feel the smooth, delicate textures of the new feather-weight wool fabrics. Designers have found inspiration in these beautiful materials, and at many overseas fashion shows displays of wool underclothes, lingerie, and negligee in new sheer wool muslins, chiffons, and laces have stolen much of the limelight. The wool retains all its natural virtues of health and protection, its comfort and fit, its easy tailoring and washability, yet is so finely spun as to be in some cases almost transparent.

THE new fine wools confounded the unknowing ones who thought that wool lacked "glamour", but their real importance lies in the fact that beauty and delicacy can now be combined with health qualities known to be essential in underwear. The most important clothing of all to health, in fact, is probably that next to the skin.

Wool keeps warmth in and cold out better than any other textile material, for not only does heat or cold pass through wool very slowly, but wool underwear provides a sort of natural "air conditioning" because of the large amount of air



entrapped in the porous fabric. Wool and air together form the best known defence against chills, because they isolate the body from the treachery of the weather and keep its temperature constant.

Absorbent and Elastic

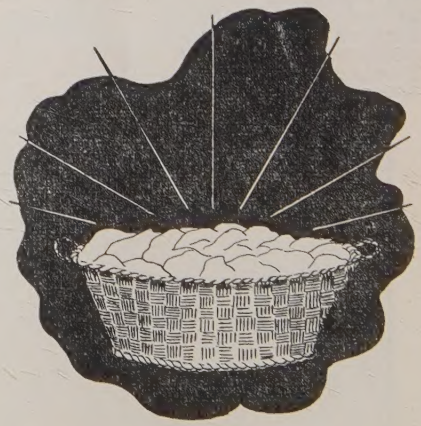
People perspire not only when they exert themselves, but to an often-unnoticeable degree all the time. With wool underwear perspiration moisture is removed instantly from the skin and absorbed into the inner structure of the wool fibre, so that the fabric remains dry, warm, and comfortable. Wool can absorb up to 30 per cent. of its own weight of moisture without becoming damp. Once absorbed, the moisture is allowed to evaporate only by degrees, so that the wearer is not subjected to a sudden reduction of temperature.

The old idea that wool underwear was something to be worn only in winter has been exploded. In summer, it is even more important that perspiration should be taken care of healthily, and cool, open-texture wool fabrics give the essential protection with a minimum of weight. Scientists have discovered that, while wool gives protection against the sun's heat rays, it freely transmits the health-giving ultra-violet rays.

In contrast to other textile fibres, wool is springy and elastic, and these qualities are unimpaired by perspiration. That gives wool underwear its comfort, as it shapes itself to the figure but does not cling to it, gives gracefully, does not ruck up, and allows freedom of movement. The natural crimp in the fibre ensures healthy ventilation, preventing the fabric from lying flat against the skin, even when wet. There is always a cushion of air between the body and the fabric, which gives the skin breathing space and helps keep out damp and cold.

Unaffected by Good Washing

Underclothes have to be washed more often than most garments, and their softness, comfort, and good fit must not be left behind in the washing water. Wool takes kindly to water if given reasonable care, losing none of its virtues even with repeated washing. The shrinkage problem, also, is now a thing of the past with new methods of control which should soon be extended to every wool undergarment.



The large amount of air held in wool fabric is mainly the result of the fibre's elasticity and serrated structure. This elasticity is not affected by water, so that wet finishing or laundering makes little difference to the amount of warmth-giving air in the fabric.

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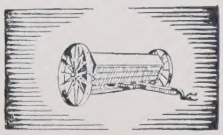

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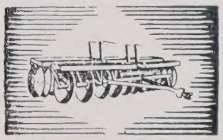

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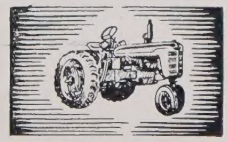

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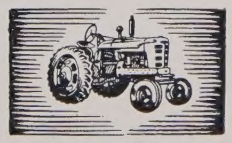

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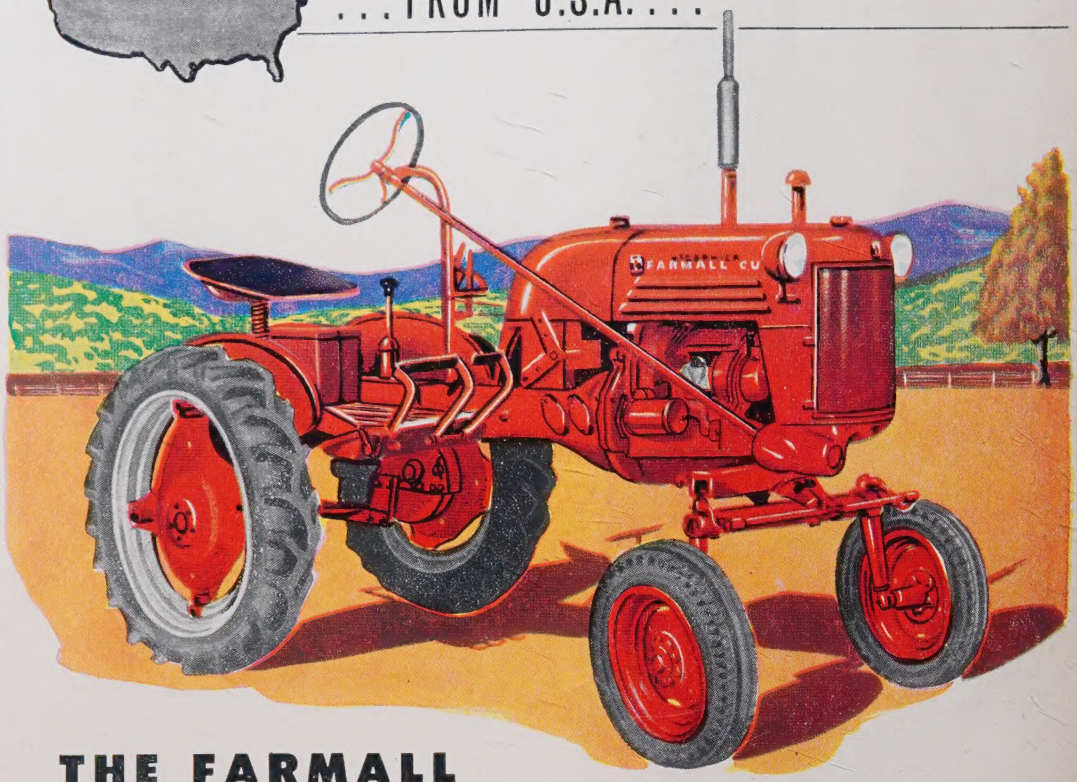

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